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THE ST. LOUIS TRANSIT SYSTEM

PRESENT AND FUTURE

CITY PLAN COMMISSION
ST. LOUIS, MO.

HARLAND BARTHOLOMEW
ENGINEER

Con. P. Curran Printing Co.
St. Louis, Mo.
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OFFICE OF
THE CITY PLAN COMMISSION
ST. LOUIS, MO.

September 30, 1920.

HONORABLE BOARD OF PUBLIC SERVICE,
City Hall, St. Louis, Missouri,

GENTLEMEN:

The City Plan Commission has the honor to submit herewith a report on the St. Louis transit system, which is the preliminary completion of another of the elements of the city plan in the continuance of our original program to submit special studies on each phase of the city plan, following which it is our intention to prepare a comprehensive plan once the preliminary studies have been thoroughly considered and revised.

In this report we have omitted mention of the question of suburban service through the use of present railroads, for which an interesting and valuable plan was prepared and submitted to this Commission by Mr. Charles S. Butts, Engineer in the Department of Public Utilities. It is our intention to give this matter consideration in a further report on the transportation problems of this city.

We have not attempted in the present report to prepare a financial study, which would be essential to any undertaking of rapid transit construction, believing that the physical plan should first be considered and discussed and in part agreed upon before we would be justified in undertaking detailed financial studies. An interesting discussion and proposal for financing rapid transit construction will be found in a report prepared by Mr. C. E. Smith, Consulting Engineer, Department of Public Utilities, previously presented to this Commission.

Respectfully submitted,

Members Ex-Officio.

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E. R. KINSEY,
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INTRODUCTION

IN THE continuance of its program of preparing special studies on various phases of the city plan, the City Plan Commission has now completed and herewith presents its proposals for the development of transit lines in the City of St. Louis. The conclusions have been arrived at only after two years and a half of careful study and analysis of the movement of cars, the flow of traffic, the distribution of population and of those other elements having a direct relation to this general problem.

All of the present lines in St. Louis are operated by a single company known as the United Railways Company of St. Louis, formed in 1899, as a result of consolidation of numerous competing lines.

Other lines were acquired in 1901 and 1907, and at the present time all the electric railways in the city are operated by the one company. It should be noted that certain interurban lines enter the city, but those from the east do not penetrate a sufficient distance to warrant consideration in this report, except in respect to the establishment of terminals, and those from the west are operated in the city by the United Railways Company as an integral part of the city service.

Because of franchise requirements of continuous operation issued to constituent companies, and because of mortgages on the property of the various original companies, it is necessary to continue operation of certain routes, thereby causing inefficient and uneconomical operation. Partly on account of this fact, partly because of over-financing, and partly because of an overestimate of the extent of growth of traffic, the United Railways Company after 20 years of more or less unsuccessful operation, went into the hands of a receiver April 12, 1919. Whatever may be the outcome of the rather complicated legal and financial situation in which the company has been involved, it is certain that the needs of the City of St. Louis, as well as the economic conditions surrounding the further operation of existing lines, demand a substantial readjustment in order to bring about a more practicable, efficient and consequently more economical system.

Transit lines exist to furnish the necessary means of transportation within a city, and those needs can best be understood and met only through a careful study of the distribution of population and the physical and financial conditions involved in the construction of a transit system. From this it becomes quite evident that only through the development of some comprehensive and carefully prepared plan which can be followed through a period of years, will there be brought about a clear knowledge of the needs which must be met. Without a general public understanding of the problems involved, every step in the readjustment or extension of the present transit system must be more or less surrounded by doubt and uncertainty which inevitably lead to criticism, misunderstanding and lack of accomplishment.

The plan submitted herewith has been the result of a year and a half of careful study. It has been so devised as to make its execution as convenient, simple and satisfactory as possible. The plan provides a satisfactory system of transit for the City of St. Louis for the next ten to twenty-five years, depending upon the city's growth within that time. Its primary merit lies in the fact that there will be avoided tremendous initial expense for rapid transit lines, while the opportunities for gradually increased efficiency of service are fully preserved. The complications arising from the fact that the company is now in the receiver's hands in no wise detracts from the value of the plan or the wisdom of its preparation and adoption at this time, for out of the receivership should come a reorganized transit company willing and capable to meet the city's needs, and this plan, prepared primarily to meet these needs, should form a basis of agreement between the city and the company for future co-operation in obtaining the best service possible.

Undoubtedly, there will be many obstacles in the way of the execution of the present plan, while changing conditions from time to time may make certain readjustments necessary.

One of the determining factors in the present plan, and one which will make for gradually increased efficiency of service on the transit lines, is the opening, widening and extension of numerous streets now being undertaken. These improvements facilitate more direct routing and quicker operation of individual transit lines. It is believed that once the present plan becomes thoroughly understood, there will be brought about a sufficiently strong public opinion thoroughly acquainted with the larger aspects of the city's growth and needs in transit matters to overcome the obstacles which now appear to be in the way of the execution of the plan. Just as the need for additional traffic thoroughfares has caused public opinion to demand such improvements as the opening of 12th street, north and south, the widening of Washington avenue, Olive street, etc., so should public opinion demand the rearrangement and extension of the transit system in accordance with some definite plan such as is herewith presented. The inconvenience of the few must not be allowed to block changes in the interest of the many.

St. Louis is now experiencing a period of most gratifying growth. The continuance of that growth will depend upon the manner in which the city meets its larger problems of city transit and railroad transportation—vital elements in the growth of any community. The larger aspects of the city-wide problem must supplant those of local interest and importance only, and, in the end, that which is essential from the city-wide standpoint will usually be found to have been most advantageous to the various local neighborhood interests.

One of the most perplexing features of the present transit situation in St. Louis, as in most other large cities, is that of maintaining sufficient income to meet the cost of operation. The majority of transit systems were installed in cities both large and small in anticipation of earnings usually far beyond what has actually been received and with the false impression upon the part of owners as well as the riding public, that all service of either long or short haul traffic and under all sorts of varying conditions could be provided for a fixed price—usually a five-cent fare. No other form of business, public or private, was ever maintained on such a basis. Metered service has followed flat rate service with the development of large groups served. The American plan hotel and the table d'hote meal have all but disappeared, and even the Postoffice Department, operating under no economic laws, has adopted a distance tariff for a large part of its tonnage.

Except where traffic has been unusually dense and the numerous costs entering into the construction and maintenance of a transit system have been low, the advancing costs in recent years have found most operating companies, including that of St. Louis, unable to provide the former service with merely the revenue derived from the former more or less universally established five-cent fare. The result has been in some cases, including St. Louis, temporary grants of increased fares, though these have usually been more or less stubbornly resisted, and even with the increased fares it is a generally accepted fact that companies have been unable to earn nominal returns upon capital invested. The future of the transit situation is, therefore, a thoroughly unknown quantity since it is no longer attracting private capital, and many of the operating companies failed to meet their obligations as they fell due. There is a more decided tendency to acknowledge that the future of transit service must become a matter of municipal credit and control, if not of municipal operation. Many of the most experienced and capable men in the business world, both those connected and those not connected with private transit companies, feel that municipal credit and control is the only way out of the present difficulties of the complicated transit situation. In any event, whether the situation in St. Louis becomes one of municipal control or the United Railways Company remains in possession of the present transit lines, there is no question but that something must be done to provide a more efficient transit system for St. Louis. The present plan will meet either situation.

As previously stated the reason for the existence of any transit system is to provide that service which the community needs. St. Louis requires and is entitled to the best form of service that can be provided. It is believed that the present plan will accomplish this end.

In this report no further attempt will be made to discuss the financial situation. It has been referred to here merely to show that the present plan is devised primarily to meet the city's needs and will be feasible whatever the method of financing and controlling the transit lines. On the other hand it is recognized that any system of operation is dependent entirely upon its being successfully financed. The City Plan Commission believes, however, that its province is to measure the city's needs and to develop a physical plan by which these needs can be met, rather than to attempt to specify the method by which the proposed plan should be financed. Whatever the financial plan, its working out will be aided by a definite physical plan such as that here presented. Undoubtedly, the next step in the accomplishment of an adequate transit plan for St. Louis will be a complete analysis of the financial situation with specific recommendations as to steps that may be necessary. As previously stated, this seems scarcely to be within the field of the City Plan Commission unless this Commission be specifically authorized to undertake such a study.

THE PRESENT TRANSIT SITUATION

The following table, giving the total street car traffic in St. Louis since the formation of the United Railways Company out of a series of individual competing lines in 1899, gives an interesting insight into the increase in traffic with the city's growth:

TOTAL ANNUAL TRAFFIC STATISTICS

Year	Revenue Passengers	Transfer Passengers	TOTAL
1900	107,430,377	34,520,296	141,950,673
1901	132,853,880	45,770,859	178,624,739
1902	145,807,496	53,228,669	199,036,163
1903	164,318,290	61,973,875	226,292,165
1904*	224,334,987	84,230,326	308,565,313
1905	189,481,887	73,632,369	263,114,256
1906	206,409,101	80,164,863	286,573,964
1907	216,779,638	91,797,610	308,577,248
1908	211,459,570	94,100,813	305,560,383
1909	221,443,845	99,311,236	320,755,081
1910	230,691,532	104,904,281	335,595,813
1911	238,240,795	110,293,228	348,534,023
1912	244,386,564	113,001,983	357,388,547
1913	253,158,476	123,266,765	376,425,241
1914	248,040,033	127,444,829	375,484,862
1915	232,771,390	124,043,205	356,814,595
1916	253,046,586	136,065,566	389,112,152
1917	262,564,865	140,735,831	403,300,696
1918	245,876,910	131,108,817	376,985,727
1919	263,221,899	145,788,430	409,010,329

NOTE—For the years 1900 to and including 1906, Suburban Railway figures are included for sake of comparison. Property was taken over January, 1907.

*—World's Fair.

The rate of growth is more clearly shown by the following summary in which the traffic is grouped by five year periods:

Five Year Period	Revenue Passengers	Transfer Passengers	TOTAL
1900–1904	774,745,028	279,724,025	1,054,469,053
1905–1909	1,045,574,041	439,006,891	1,484,580,932
1910–1914	1,214,517,400	578,911,086	1,793,428,486
1915–1919	1,257,481,650	677,741,849	1,935,223,499
	4,292,318,119	1,975,383,851	6,267,701,970
Percent "1915–1919" of "1900–1904"	162	242	183

For approximately ten years there was a continued increase in the total number of passengers carried annually. The individual lines that had been laid out considerably in advance of the city's growth were able to adequately care for that growth over a period of approximately ten years without any material change or extension of facilities. After that time, as the traffic became more dense, the movement of people and of cars became more complicated and difficult. Actually, within the past five years, it may be said that the lack of extensions and new facilities has had a considerable bearing upon the growth and expansion of the city, which, together with other factors, is reflected in the tables above. It is true that the outbreak of the war brought about an overstimulated business and industrial development along the Atlantic Coast, while the business and growth of St. Louis practically remained at a standstill. To this can be attributed in part the temporary decrease in traffic on the transit lines since 1914, though this is by no means the only factor contributing to the decrease in total traffic. Fortunately within the past year St. Louis has experienced renewed industrial and commercial activity far beyond anything within the city's history. The city is now confronted with an acute transit situation that demands speedy readjustment.

The accompanying map (No. 2) showing by zones the time of travel from the center of the business district to all portions of the city emphasizes the need for more direct routings in order that a greater area of the city may be reached within a given period than is now possible. This map discloses the interesting fact that the present street system, while thoroughly inadequate, offers more direct routings for transit lines to the west than to the north or south. The resulting greater territory included within the 30 and 40 minute zones has been instrumental in recent years in stimulating the growth of the western part of the city, and has quite naturally caused the westward movement of the people on transit lines to be far greater than that either to the north or south (Map No. 1). It is of interest to note in this connection, that the narrow and crooked streets which have made travel to the north and south slower than to the west are being widened and straightened under plans developed by this Commission. Another factor of importance in the matter of the rapid growth of the western part of the city is the well recognized fact that it is easier to develop new territory than to rehabilitate sections that have retrogressed. That the time necessary to reach the center of the city is an important factor is graphically shown by the map (No. 1), illustrating the total movement of traffic on the transit lines. This map shows how great is the proportion of travel westward from the business district as compared with that north or south. Interesting also in this connection is the accompanying map (No. 2) which shows that by far the greater majority of the people of St. Louis live within the 35 minute time zone. In fact so graphic is the story told by this map that one might almost reach the conclusion that the 35 minute time zone has very nearly determined the extent of residential development within the city limits, and bears out

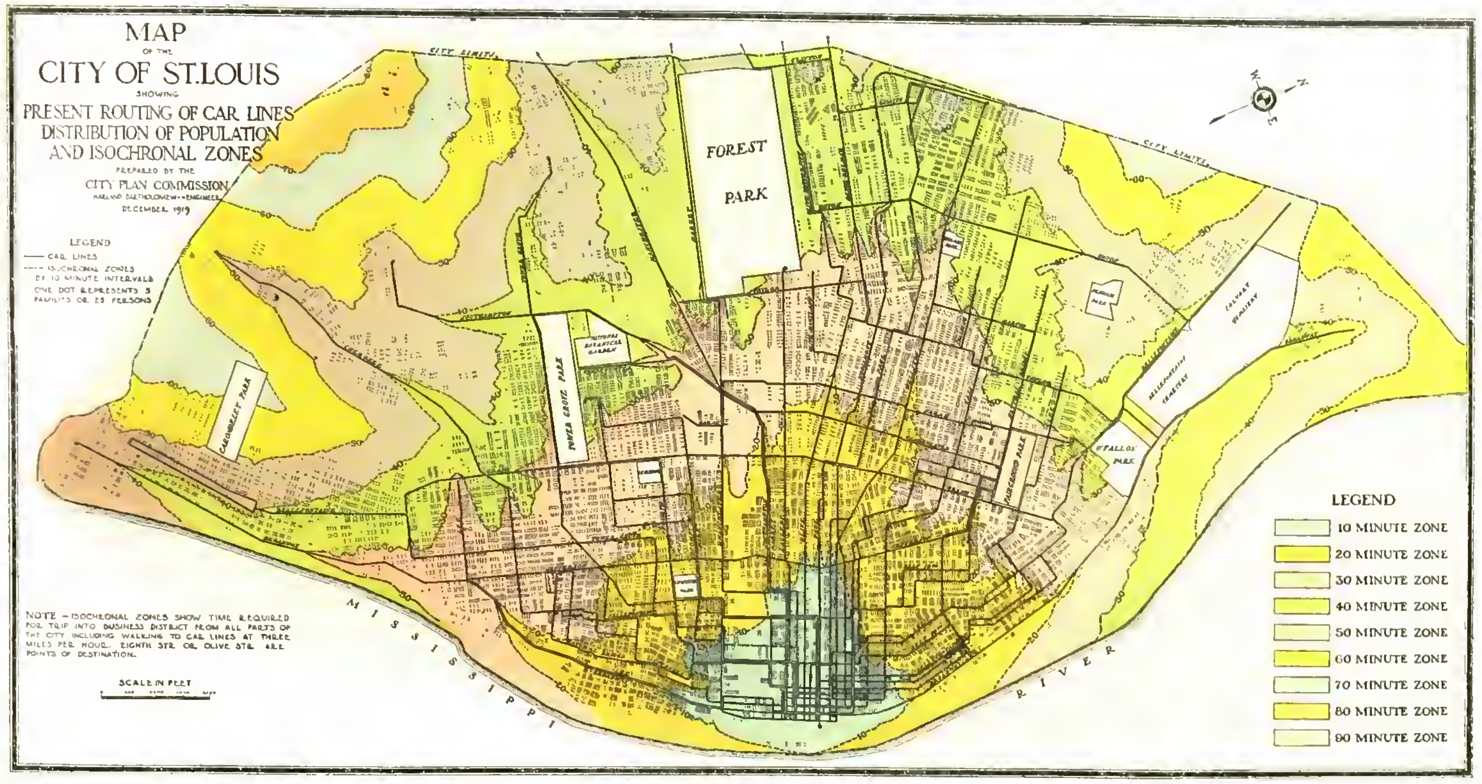

MAP
OF THE
CITY OF ST.LOUIS
SHOWING
PRESENT ROUTING OF CAR LINES
DISTRIBUTION OF POPULATION
AND ISOCHRONAL ZONES
PREPARED BY THE
CITY PLAN COMMISSION
HARLAND BARTHOLOMEW - ENGINEER
DECEMBER 1919
LEGEND
CAR LINES
ISOCHRONAL ZONES BY 10 MINUTE INTERVALS
ONE DOT REPRESENTS 5 FAMILIES OR 25 PERSONS
FOREST PARK
CITY LIMITS
MISSISSIPPI RIVER
LEGEND
10 MINUTE ZONE
20 MINUTE ZONE
30 MINUTE ZONE
40 MINUTE ZONE
50 MINUTE ZONE
60 MINUTE ZONE
70 MINUTE ZONE
80 MINUTE ZONE
90 MINUTE ZONE
NOTE - ISOCHRONAL ZONES SHOW TIME REQUIRED FOR TRIP INTO BUSINESS DISTRICT FROM ALL PARTS OF THE CITY INCLUDING WALKING TO CAR LINES AT THREE MILES PER HOUR. EIGHTH STR. OR OLIVE STR. ARE POINTS OF DESTINATION.
SCALE IN FEET

DIAGRAM No. 2

This map shows the distribution of population and the traveling time from Eighth and Olive streets to any point in the city. The more or less general rule that the majority of population in any city will live within an area that can be reached in not more than thirty minutes from the central business district is forcefully illustrated by this diagram. The greater distances westward that can be reached in any given time undoubtedly accounts for the heavier travel and more rapid recent growth of that section of the city.

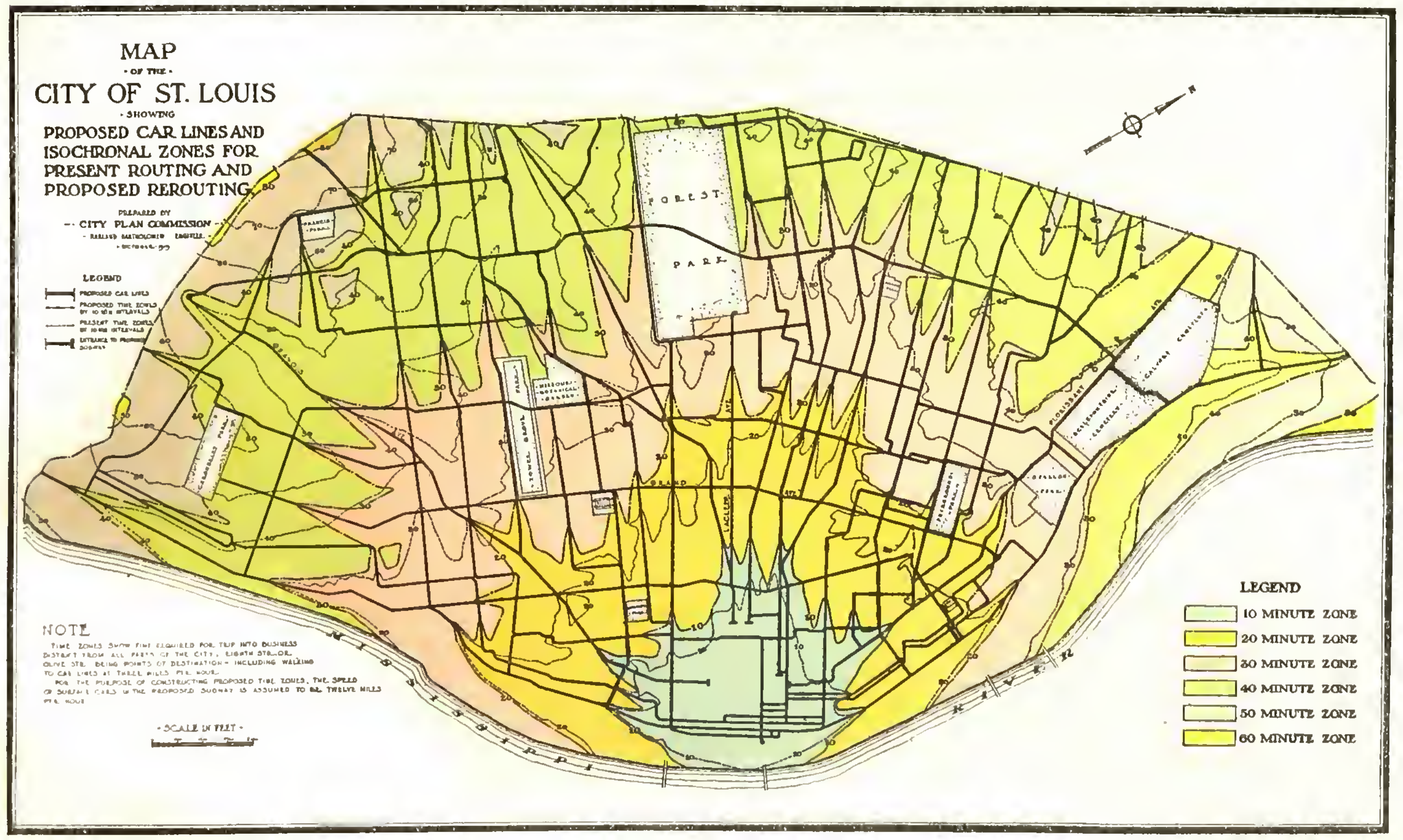

MAP
OF THE
CITY OF ST. LOUIS
SHOWING
PROPOSED CAR LINES AND
ISOCHRONAL ZONES FOR
PRESENT ROUTING AND
PROPOSED REROUTING
PREPARED BY
CITY PLAN COMMISSION
HARLAND BARTHOLOMEW ENGINEER
OCTOBER 1919
LEGEND
PROPOSED CAR LINES
PROPOSED TIME ZONES BY 10 MIN INTERVALS
PRESENT TIME ZONES BY 10 MIN INTERVALS
ENTRANCE TO PROPOSED SUBWAY
FOREST PARK
LEGEND
10 MINUTE ZONE
20 MINUTE ZONE
30 MINUTE ZONE
40 MINUTE ZONE
50 MINUTE ZONE
60 MINUTE ZONE
NOTE
TIME ZONES SHOW TIME REQUIRED FOR TRIP INTO BUSINESS DISTRICT FROM ALL PARTS OF THE CITY, EIGHTH STR. OR OLIVE STR. BEING POINTS OF DESTINATION - INCLUDING WALKING TO CAR LINES AT THREE MILES PER HOUR.
FOR THE PURPOSE OF CONSTRUCTING PROPOSED TIME ZONES, THE SPEED OF SURFACE CARS IN THE PROPOSED SUBWAY IS ASSUMED TO BE TWELVE MILES PER HOUR
SCALE IN FEET
MISSISSIPPI RIVER

DIAGRAM No. 3

A re-routing of the transit lines based in part on certain street openings for which ordinances have recently been passed, combined with certain extensions in the northwestern and southwestern parts of the city, will reduce the traveling time considerably to a large proportion of the city's area and thus encourage its development within what might be called the city's habitable area now unused, primarily because of lack of transit facilities. Compare this diagram with No. 2.

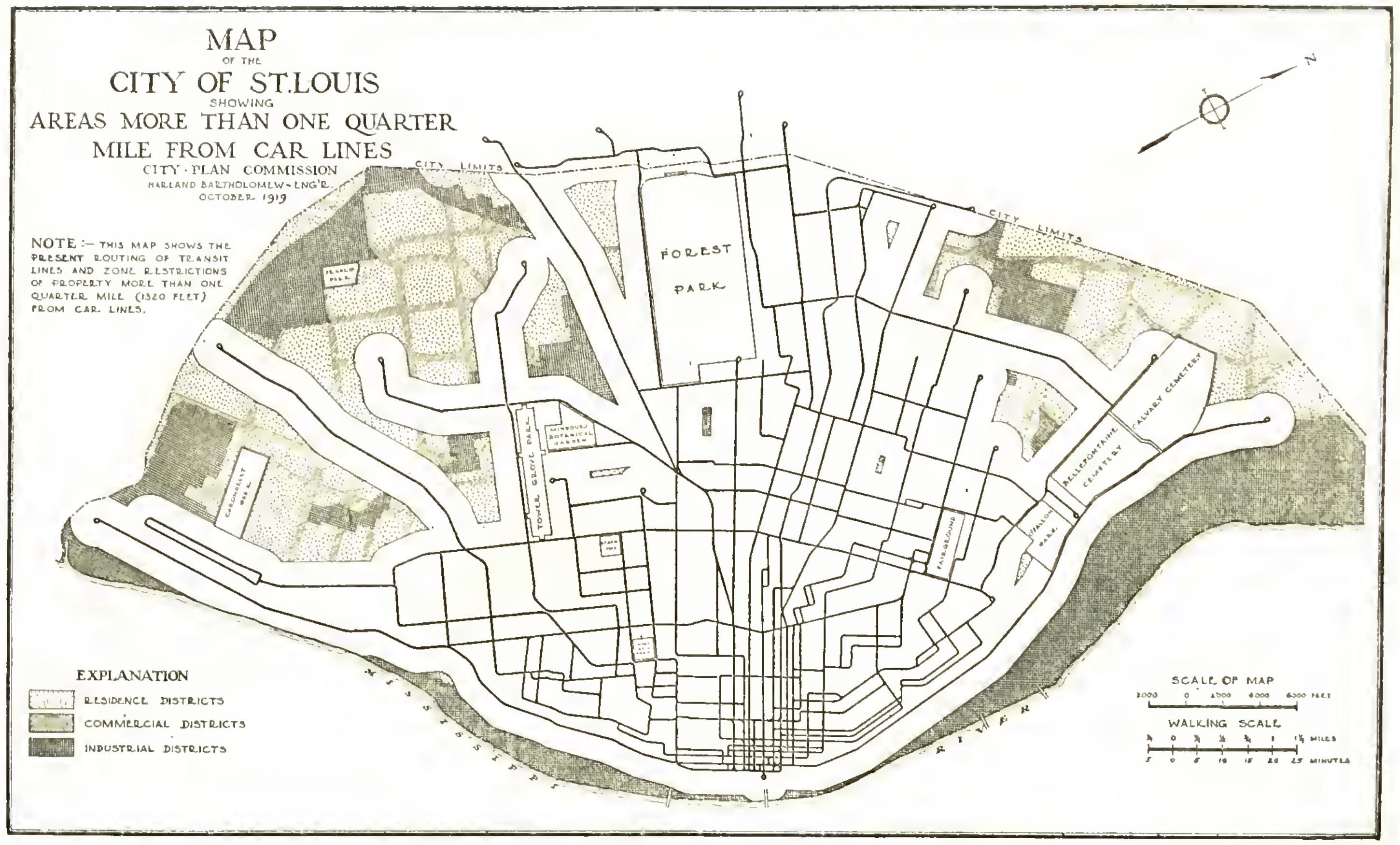


DIAGRAM No. 4

Areas more than one-quarter of a mile from a car line are here shown, the different designations representing whether the property may be used for residence, commercial or industrial purposes under the Zone Law. Practically all of these areas are now unoccupied as may be seen by comparing this diagram with No. 2, which shows the distribution of population.

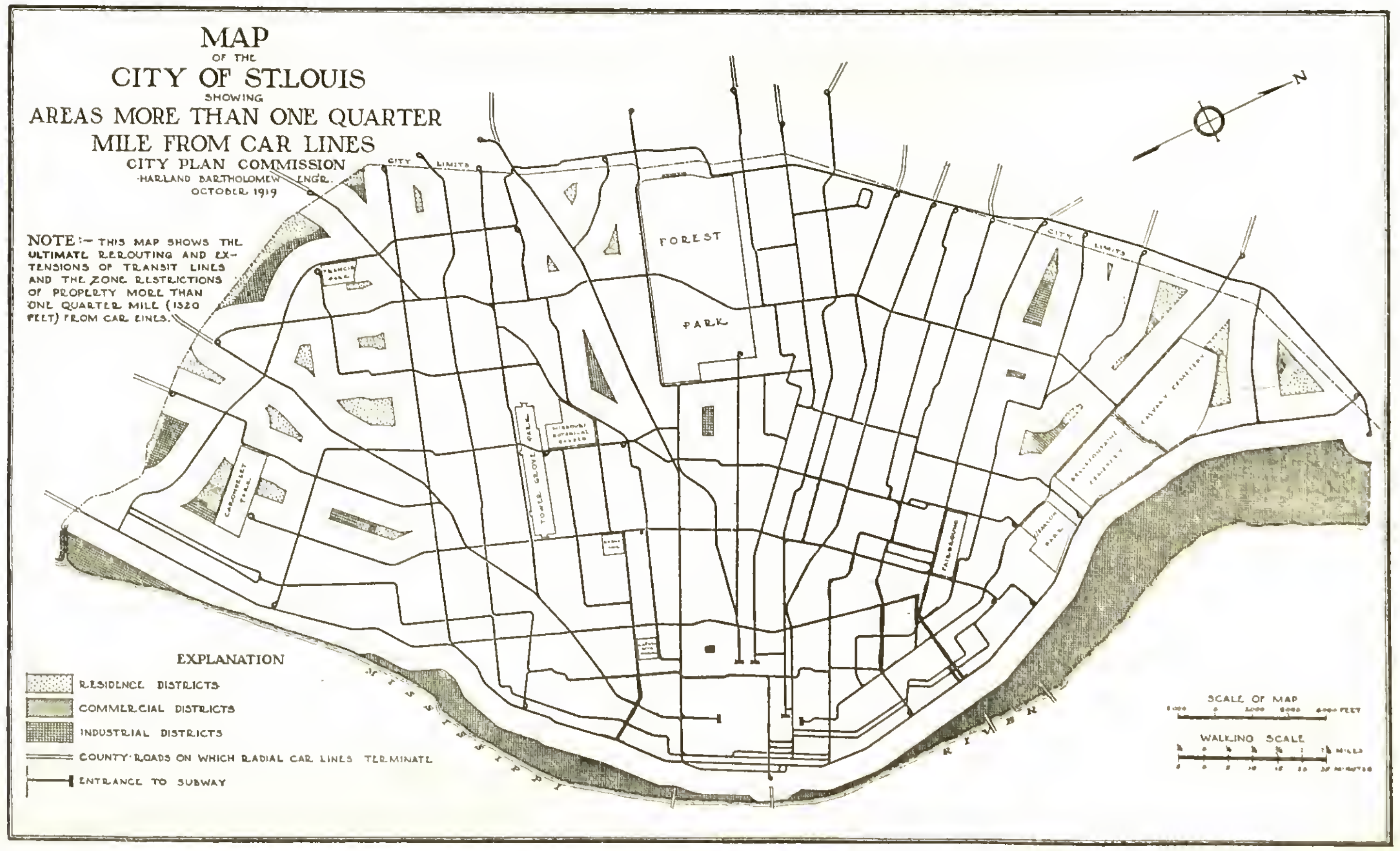

MAP
OF THE
CITY OF ST.LOUIS
SHOWING
AREAS MORE THAN ONE QUARTER
MILE FROM CAR LINES
CITY PLAN COMMISSION
HARLAND BARTHOLOMEW ENGR.
OCTOBER 1919
NOTE :- THIS MAP SHOWS THE ULTIMATE REROUTING AND EXTENSIONS OF TRANSIT LINES AND THE ZONE RESTRICTIONS OF PROPERTY MORE THAN ONE QUARTER MILE (1320 FEET) FROM CAR LINES.
CITY LIMITS
FOREST PARK
N
EXPLANATION
RESIDENCE DISTRICTS
COMMERCIAL DISTRICTS
INDUSTRIAL DISTRICTS
COUNTY ROADS ON WHICH RADIAL CAR LINES TERMINATE
ENTRANCE TO SUBWAY
MISSISSIPPI RIVER
SCALE OF MAP
WALKING SCALE

DIAGRAM No. 5

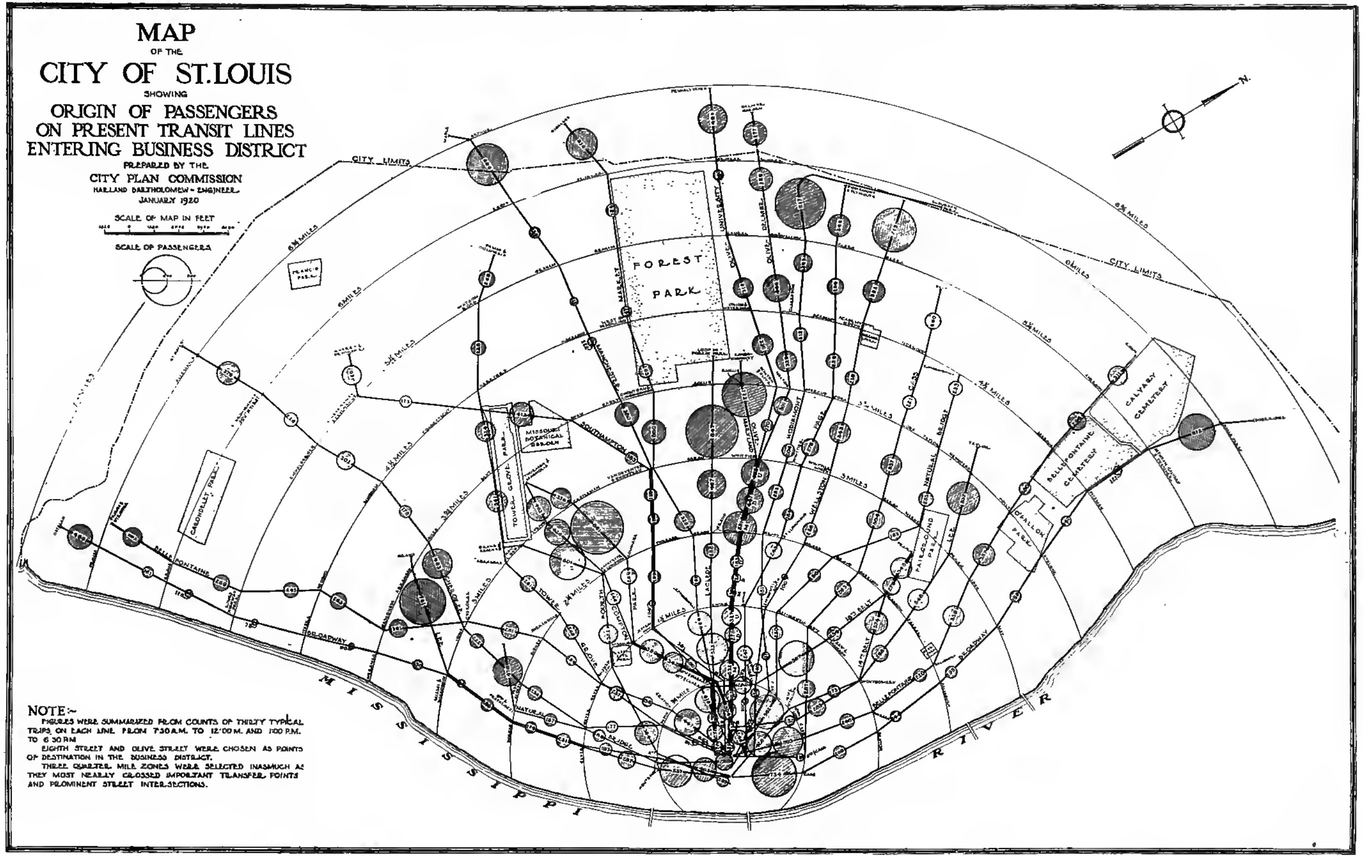
By re-routing and extending the transit lines as suggested in this report practically all areas within the city limits will be within easy walking distance of a car line. Compare this with No. 4 above.

the generally accepted law of transportation—that the majority of people in any city will live within a zone which can be reached in not more than one-half hour from their places of work. No better illustration of the merits of the transit plan proposed in this report can be had than by a comparison of the map (No. 3) showing the new time zones resulting from the proposed plan and the map (No. 2) showing present time zones, which shows that 11.05 square miles, or 18.0% of the city's area will be added to zones from which 8th and Olive Streets can be reached in 35 minutes or less. At present 21% of the city's area is more than ¼ mile from a car line, excluding river front areas, whereas under the plan proposed herewith this percentage of area more than ¼ mile from a transit line is reduced to 3%. (See Maps No. 4 and 5.)

In addition to the difficulties of over-capitalization and the inefficiency of the system created by a combination of individual competing lines, there are numerous other difficulties peculiar to the St. Louis transit situation. The physical shape of the present city is that of an ellipse, with the business district located at the extreme outer edge. There results the necessity of a longer haul of traffic to all parts of the city than would be the case were the business district located at the geographical center of the city in the neighborhood of Grand Avenue and Olive Street. Hauls of five or six miles are not the exception but more nearly the rule. Even this haul would not be so objectionable were it not for the fact that very nearly half of it is through sections of the city which have constantly deteriorated in usefulness and, from the standpoint of transit, are almost entirely unremunerative. This is indicated by the map (No. 6), showing the origin of traffic throughout the city.

Present tendencies with respect to the distribution of population seem to indicate that this condition is becoming more pronounced than ever before. Suburban districts have recently shown indications of unusual development, while there is no substantial movement on the other hand to bring about a higher degree of usefulness for those sections of the city, commonly termed the blighted districts, where the usefulness and value of property has been declining for many years.

Studies described more in detail later in this report indicate a rather more pronounced rush-hour movement than is commonly experienced in other large cities. All of these conditions, as previously stated, serve to produce an unusually complicated transit problem in St. Louis. The narrow streets of the business districts are constantly becoming more and more crowded with automobiles, making the movement of trolley cars still more difficult under conditions which at best would be far from satisfactory. One of the commendable and efficient features of the present system is the even distribution of transit lines and loops within the business district, as illustrated by map (No. 7). Even now, however, it is well-nigh impossible



MAP
OF THE
CITY OF ST. LOUIS
SHOWING
ORIGIN OF PASSENGERS
ON PRESENT TRANSIT LINES
ENTERING BUSINESS DISTRICT
PREPARED BY THE
CITY PLAN COMMISSION
HARLAND BARTHOLOMEW - ENGINEER
JANUARY 1920

SCALE OF MAP IN FEET

SCALE OF PASSENGERS

NOTE:-
FIGURES WERE SUMMARIZED FROM COUNTS OF THIRTY TYPICAL TRIPS ON EACH LINE FROM 7:30 A.M. TO 12:00 M. AND 1:00 P.M. TO 6:30 P.M.
EIGHTH STREET AND OLIVE STREET WERE CHOSEN AS POINTS OF DESTINATION IN THE BUSINESS DISTRICT.
THREE QUARTER MILE ZONES WERE SELECTED INASMUCH AS THEY MOST NEARLY CROSSED IMPORTANT TRANSFER POINTS AND PROMINENT STREET INTERSECTIONS.

DIAGRAM No. 6

The relative proportion of the volume of travel originating in different parts of the city is shown by the number and size of the various circles.

to meet the demands of the evening rush-hour within the business district, and the time will soon come when the removal of certain transit lines from the surface of these narrow streets within the business district will become a matter of urgent necessity.

The problems of the immediate future for the improvement of transit facilities of St. Louis are:

(1) Relief of the congestion in the business district.

(2) More direct routings to all parts of the city.

St. Louis does not now need rapid transit. The suggestions for the improvement of the present system contained later in this report will so improve present facilities that the city may grow without serious inconvenience for a period of at least ten years. There is not now a sufficiently great movement of people in any one direction to warrant the establishment of rapid transit facilities, and neither the city nor the present company is in a position at the present time to undertake the financing of rapid transit facilities. Our studies of the traffic movement indicate that it would not be possible to construct rapid transit facilities which would be a justifiable financial adventure. Furthermore, the construction of a system of rapid transit now would be a positive detriment to the growth of the city, particularly when it is considered that such rapid transit facilities would tend still further to encourage the shift of population to the outer suburban districts and consequently would lessen still more the usefulness and value of the intermediate areas. On the other hand, the increasing of their usefulness and value is one of St. Louis' greatest problems today. St. Louis is a sprawling city and needs a greater intensity of development within the intermediate central areas of the city before rapid transit facilities will be justified.

A rerouting of street car lines producing more direct service will meet the present needs of this city without the construction of rapid transit lines. Some extensions of the present lines, in order to bring within the zone of usefulness those sections of the city to the northwest and southwest, are now or will soon be desirable and justifiable from a financial standpoint.

We cannot, of course, ignore the fact that eventually St. Louis will need rapid transit facilities, even though the day of their construction is possibly ten or twenty-five years hence, depending upon the character and extent of the city's growth. In anticipation of the time when rapid transit facilities will be needed and in order to relieve one of the more acute transit conditions which exists today, namely that of street congestion in the business district, it is recommended that a subway be constructed within the business district for the accommodation and use of all the east and west trolley lines, which subway can be so constructed and so designed as later to form a part of a comprehensive subway system for rapid transit

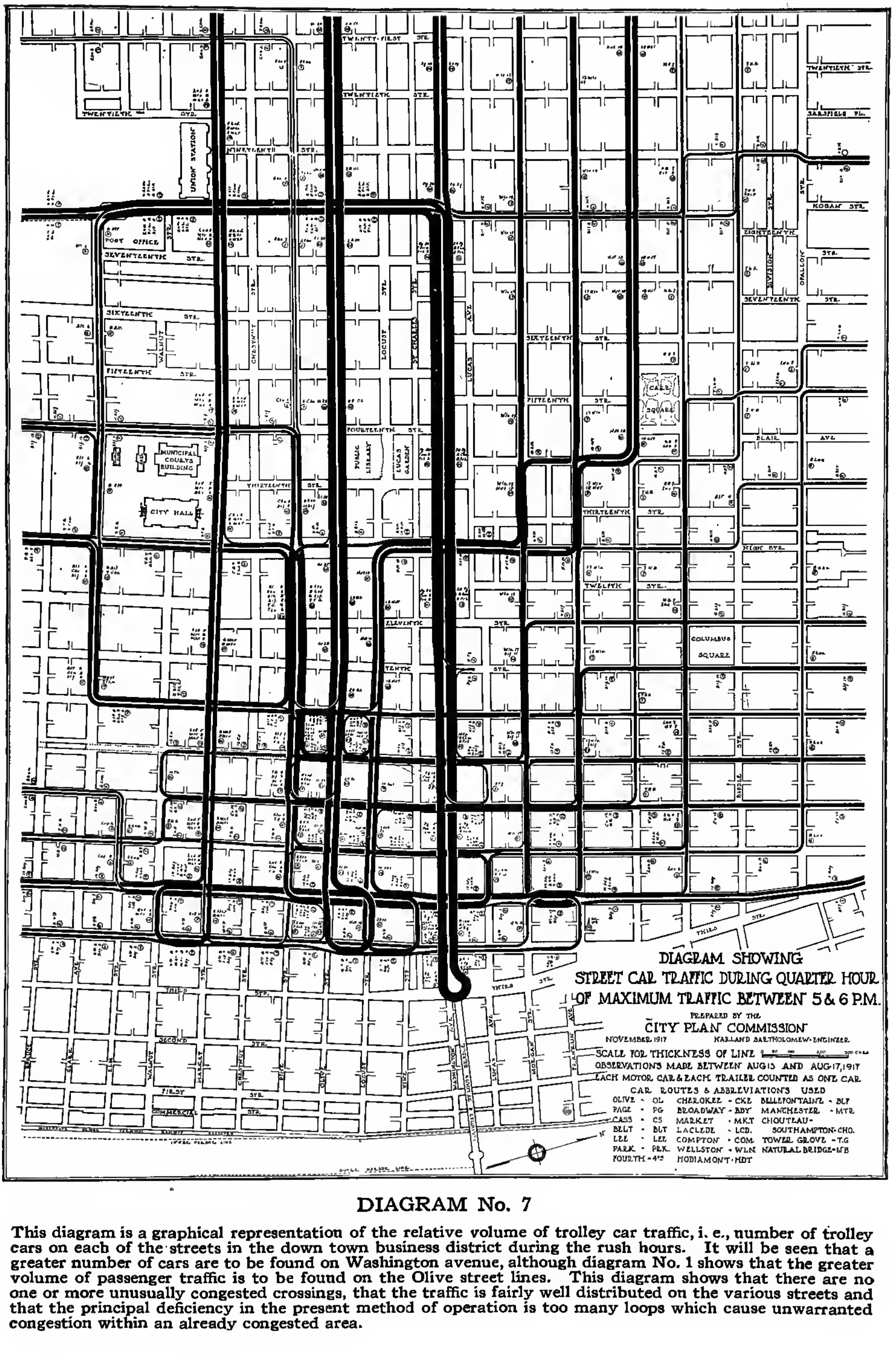


DIAGRAM No. 7

This diagram is a graphical representation of the relative volume of trolley car traffic, i. e., number of trolley cars on each of the streets in the down town business district during the rush hours. It will be seen that a greater number of cars are to be found on Washington avenue, although diagram No. 1 shows that the greater volume of passenger traffic is to be found on the Olive street lines. This diagram shows that there are no one or more unusually congested crossings, that the traffic is fairly well distributed on the various streets and that the principal deficiency in the present method of operation is too many loops which cause unwarranted congestion within an already congested area.

purposes. Such a procedure as is herein recommended is believed to be economically sound in that it will solve the present problem with a minimum of expenditure and come nearer to paying for such expenditure through economies of operation than any plan yet suggested.

The proposed plan will, in the opinion of the Commission, double the street capacity in the business district through the removal of a substantial majority of the trolley lines.

A study of distribution of population in St. Louis indicates quite clearly that the future location of rapid transit lines is very nearly fixed. It is evident, for instance, that because of the preponderance of traffic in a westerly direction the first rapid transit line should be built to the west. The Hodiamont right-of-way seems to be particularly adapted to the use of such a line, dividing as it does the large population between Lindell Boulevard and Easton Avenue. East of Grand Avenue this rapid transit line will use the widest street available. Washington Avenue today is the only street having a width of over 60 feet, itself being but 80 feet wide. When Olive Street is widened to 100 feet, for which an ordinance has recently been passed, it will become the natural route for such a line, affording a peculiarly strategic entrance into the business district.

To the south—Gravois Avenue is the only available and direct radial street. It practically bisects the tremendous population in the southern part of the city. When widened to 100 feet east of Grand Avenue, as proposed, it will form the only practical location for a rapid transit line southward.

On the north—the proposed new North 12th Street route, by turning west on Natural Bridge Avenue to the City Limits, likewise affords the only available entrance for a rapid transit line. Natural Bridge Avenue is particularly well located, as it evenly divides the large population to be found north of Easton Avenue and south of Florissant Avenue.

An accompanying illustration (Map No. 18) shows the distribution of population with respect to the three rapid transit routes above mentioned. A fourth route branching to the southwest on Manchester Avenue is shown. The location of this route might vary somewhat, depending upon future developments in the River des Peres Valley. There is small doubt but that such a route would of necessity use Manchester Avenue, since this is practically the only direct radial thoroughfare leading out to the populous suburban districts of the southwest.

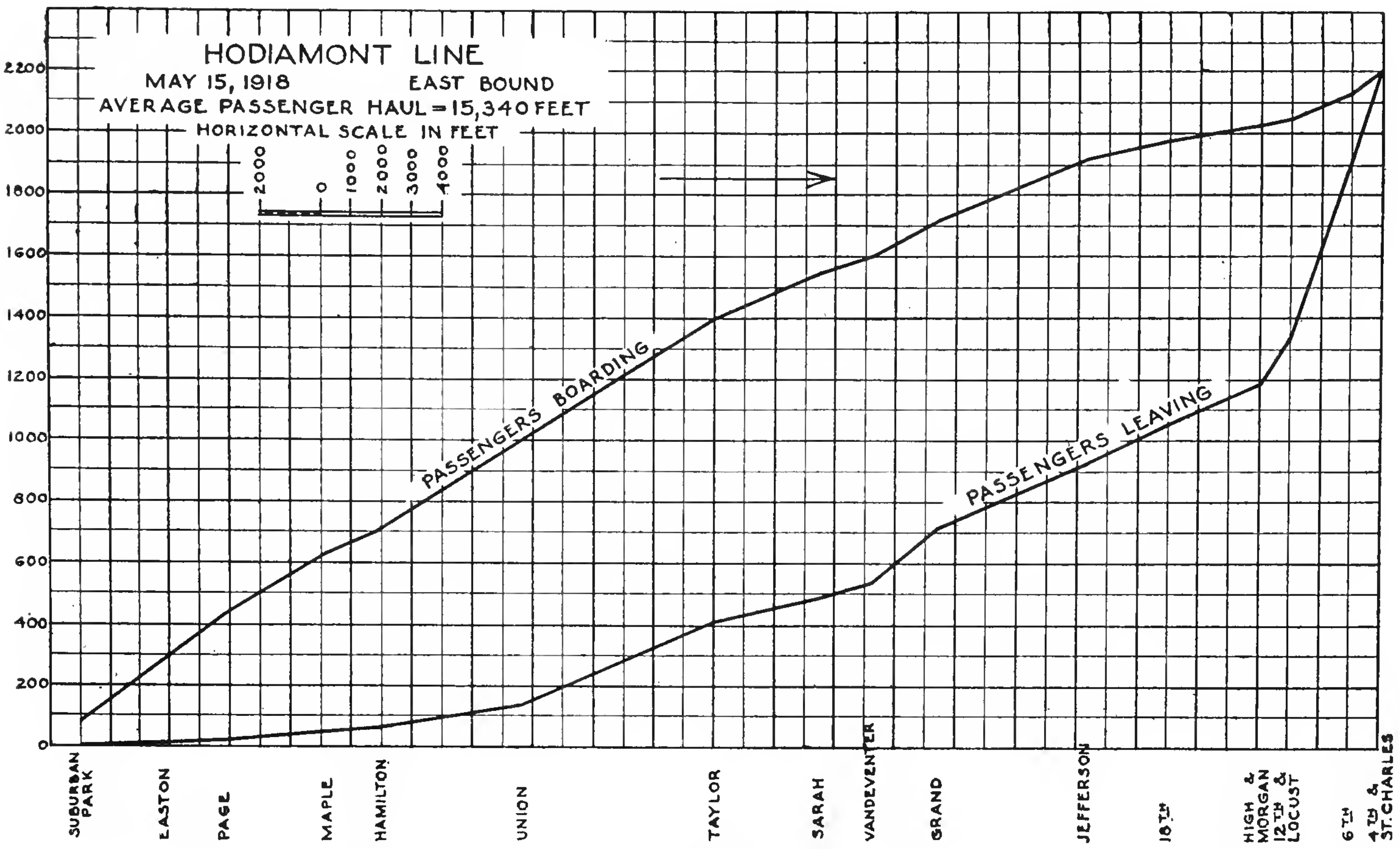


CHART No. 8

This is a typical chart similar to those made for each line in the city showing where passengers board and leave the cars.

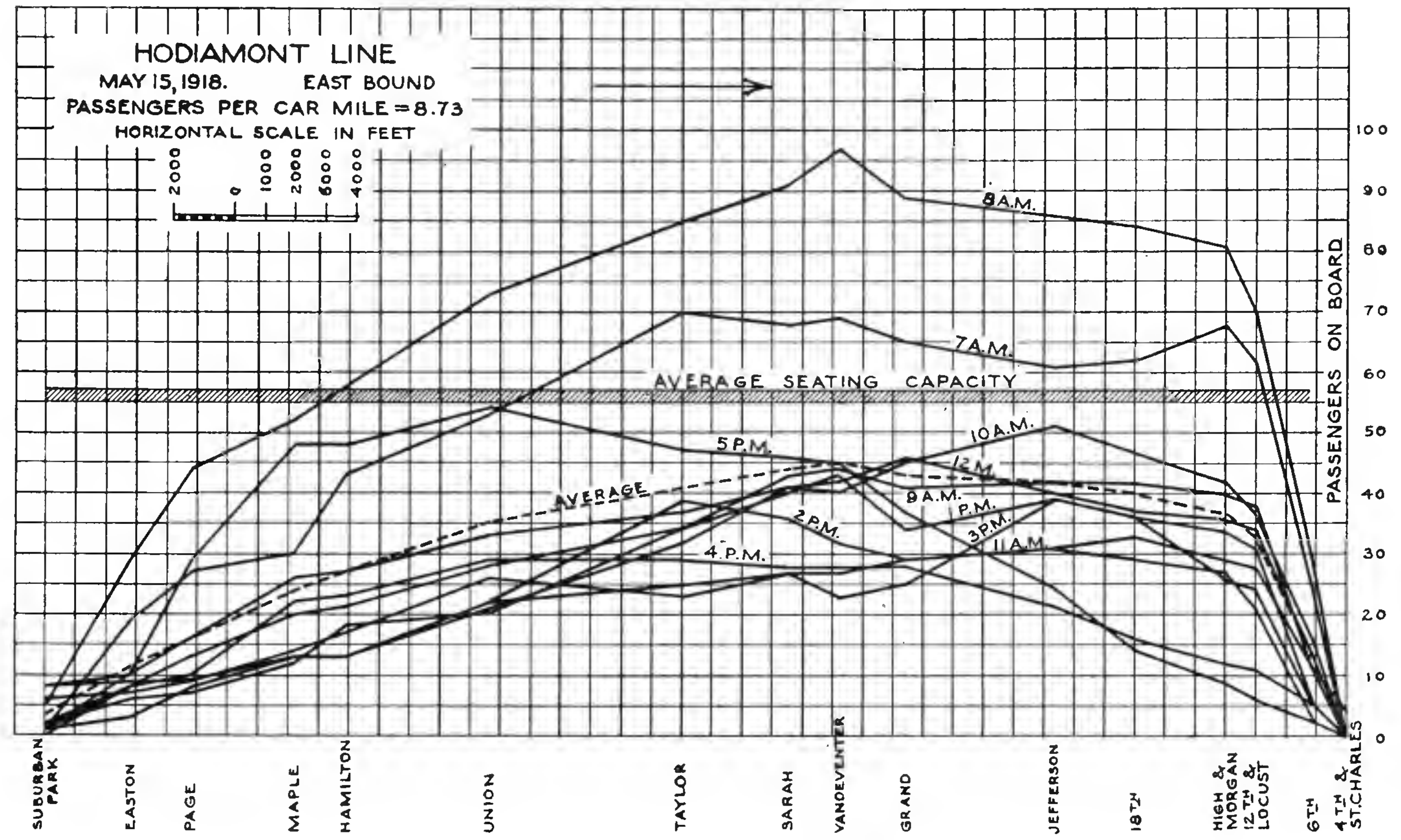


CHART No. 9

This is a typical chart similar to those made for each line in the city showing the proportionate volume of travel at any given point on the line for different hours of the day.

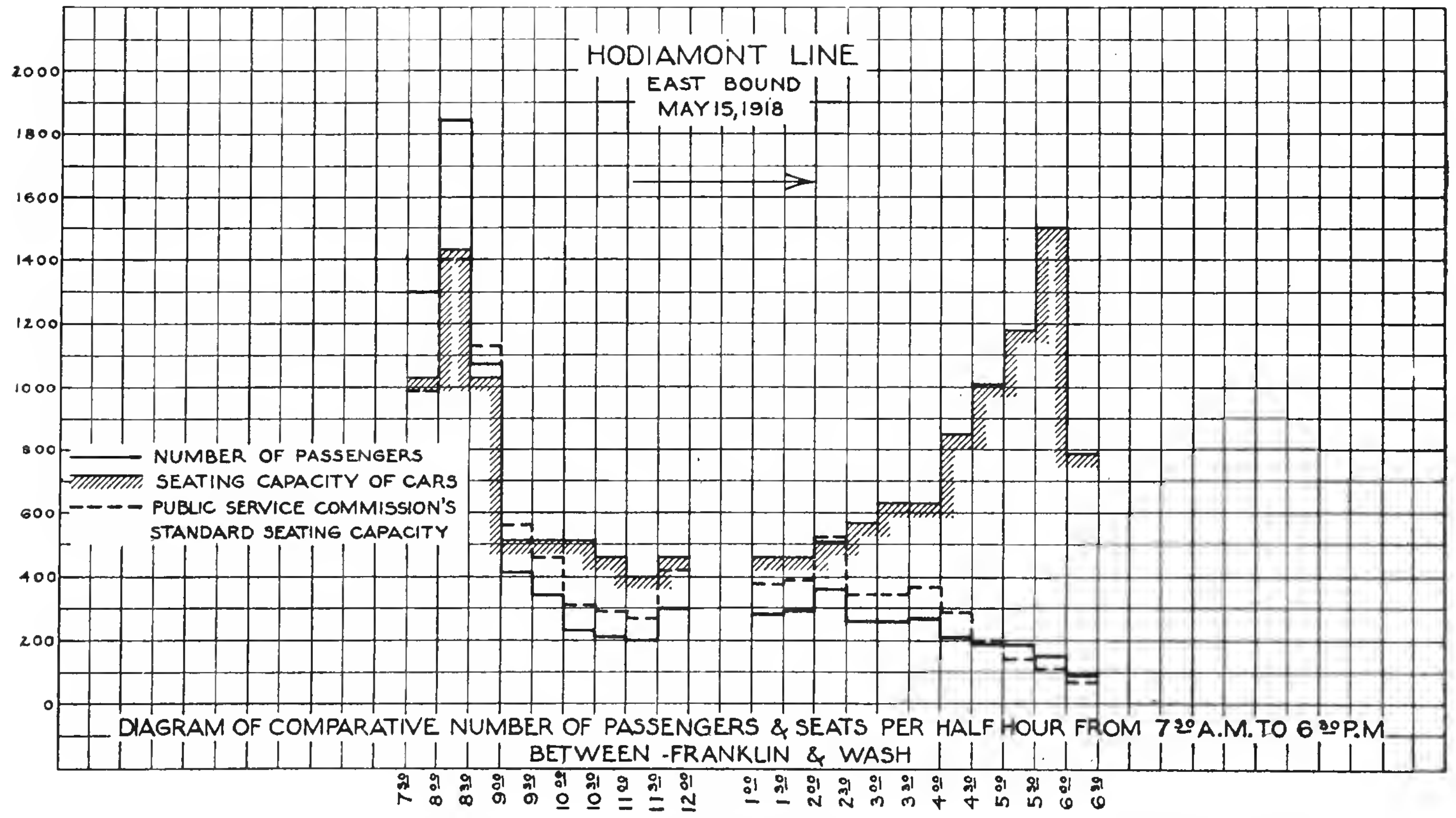


CHART No. 10

This is a typical chart similar to that made for each line in the city showing for each half hour period of the day the number of passengers using the line, the seating capacity of the cars furnished by the company and the standard seating capacity required by the Public Service Commission's order. Note the unusual volume of travel between 8 and 8:30 A. M. and the great excess of service provided between 4 and 6:30 P. M. in order to provide accommodations for travel in the opposite direction during the rush hour.

THE TRANSIT STUDIES MADE

In order to obtain accurate and complete information as to the movement of people on the various transit lines of the city, the service given on these lines and the extent of their use over different portions of their routes, the City Plan Commission made a careful and thorough study of the entire transit system. This study was extensive in its scope and intensive in nature. The observations covered a period of about six weeks from April 20 to May 31, 1918. Approximately thirty men were used as checkers and tabulators in connection with securing the information required. Since that time more than a year has been devoted in the office to the checking, plotting and studying of the information then gathered. The information was collected in part by stationing the checkers at various points throughout the city, and in part by having other checkers ride on the cars, noting the number of people entering and leaving at all points on each line. An entire day was devoted to the study of each line operated by the United Railways Company.

Without attempting to describe in detail the results to be drawn from the study of each individual line, there is presented herewith a series of three charts (Nos. 8-10), illustrating the manner in which information secured was first plotted. There were 168 such charts prepared, three for each direction of each of the twenty-eight lines now operated. These charts are on file at the office of the City Plan Commission and are not herewith reproduced because of the expense involved.

The first of these typical charts (No. 8) shows the total number of passengers entering and leaving the Hodiamont Line as counted by riding checkers throughout the entire day. Approximately twenty-two hundred people were counted by checkers riding on this line. The upper curve shows at what points on the line passengers entered. The lower line shows at what point on the line passengers left. From this chart it was possible to determine such important information as the average passenger haul, the number of passengers per car-mile and places where the line was used the most as well as where there was little or no traffic originating. The second chart (No. 9) shows for typical cases the variations of riding by hours throughout the day. This chart gave interesting and valuable information with respect to the location of points of maximum riding as well as being a graphical illustration of the extent of riding at various hours during the day. The third chart (No. 10) shows by half-hour intervals throughout the day the number of seats provided on the whole line, the number of passengers riding as well as the service required according to the standard established by the Public Service Commission. This chart is an accurate index of the character and extent of service provided by the operating company.

Much other information was computed and compiled, such as the total number of passengers using each line according to counts made, the number of passengers per car-mile, the average passenger haul, the maximum number of passengers carried at any time, the maximum point of loading, the average number of passengers per trip and in the evening rush hour, the average speed and maximum headway for each individual line. This and other information is shown on the accompanying chart (No. 11) entitled "Summary of Traffic Counts."

This office also had the benefit of information kindly furnished by the United Railways Company, as well as studies previously made in the Department of Public Utilities by Mr. C. E. Smith, Consulting Engineer and by Mr. Charles S. Butts.

THE PROPOSED TRANSIT PLAN

Obviously the first step in the development of a satisfactory transit plan for St. Louis is the rerouting of lines where this can be done with a minimum amount of inconvenience. Some study has been given to the question of how the proposed rerouting will be affected by present outstanding bonds issued by the individual original competing lines. The obligations of these underlying companies in many cases make desirable reroutings extremely difficult. The present receivership, however, should prove an advantage, for while reroutings at the present time may be more or less difficult, if not entirely impossible, with the termination of the receivership there should result a company newly financed through the issuance of new securities in place of securities now outstanding against individual lines, thus making possible as complete a rerouting plan as will prove desirable and necessary.

Obviously it would be difficult to undertake a complete rehabilitation of the present system at one time. The proposed plan submitted herewith, therefore, has been divided into three steps for gradual accomplishment pending the time when rapid transit lines will be justified and can be financed. Certain suggestions made in the three steps outlined might be interchanged. Considerable attention, however, has been given to the more simple reroutings which would now be possible, most of which are contained in Step No. 1. Some of the reroutings suggested in Steps Nos. 2 and 3 are dependent upon various street openings and widenings which cannot be completed immediately. No definite period of accomplishment for the execution of all reroutings contained in any of the three steps is therefore suggested, although it is believed that most of the reroutings of Step No. 1 could be completed shortly after the company emerges from the receivership, while practically all of the reroutings and changes suggested in Steps Nos. 2 and 3 should be completed within a period of from five to fifteen years.

SUMMARY OF TRAFFIC COUNTS

PREPARED BY THE

CITY PLAN COMMISSION

LINE	DATE OF OBSERVATION	DIRECTION	LENGTH	NUMBER OF RIDING COUNTS	TOTAL NUMBER OF PASSENGERS BOARDING	NUMBER OF PASSENGERS PER CAR MILE	AVERAGE PASSENGER HAUL	MAXIMUM NUMBER OF PASSENGERS AT ONE TIME	POINT OF MAXIMUM LOADING	AVERAGE NUMBER OF PASSENGERS PER TRIP	AVERAGE NUMBER OF PASSENGERS IN EVENING RUSH HOUR	AVERAGE SPEED PER HOUR SCHEDULE TIME	AVERAGE SPEED PER HOUR OBSERVED TIME	MAXIMUM HEADWAY	MINIMUM HEADWAY
BELLEFONTAINE	MAY 17, 1918	NORTH	14.94 MILES	27	3544	8.58	13,860 FEET	98	CASS	128	176	9.96 MILES	10.2 MILES	6.00 MIN.	1.36 MIN.
		SOUTH	14.50 "	27	3506	9.81	15,720 "	110	CASS	142	220	9.66 "	10.2 "	6.00 "	2.00 "
BELT	MAY 13, 1918	18TH	7.82 "	33	2802	11.50	5,880 "	95	18TH & WASHINGTON	93	158	8.23 "	8.4 "	N 7.50 "	N. 2.14 "
		14TH	7.80 "	30	2385	10.35	6,880 "	90	18TH & WASHINGTON	80	123	8.23 "	8.0 "	S 7.50 "	S. 2.30 "
BROADWAY	MAY 16, 1918	NORTH	14.73 "	34	3696	8.15	15,860 "	103	CHOUTEAU	125	169	11.05 "	11.4 "	5.00 "	1.76 "
		SOUTH	14.73 "	34	3751	8.96	17,640 "	96	MORGAN	138	183	11.05 "	10.8 "	5.00 "	1.30 "
CASS	MAY 1, 1918	EAST & SOUTH	6.25 "	33	2056	10.39	8,340 "	112	15TH ST	65		8.92 "	9.6 "	5.00 "	1.15 "
		NORTH & WEST	6.28 "	33	2480	10.11	9,040 "	104	19TH ST	64	109	8.92 "	9.6 "	5.00 "	1.15 "
CHEROKEE	APRIL 29, 1918	NORTH & EAST	8.71 "	28	2104	8.48	10,020 "	80	CALIFORNIA	72		10.45 "	10.8 "	7.50 "	1.76 "
		SOUTH & WEST	8.42 "	28	2140	8.94	13,160 "	94	CALIFORNIA	76	131	10.08 "	9.6 "	7.50 "	1.76 "
COMPTON	APRIL 23, 1918	NORTH & EAST	4.87 "	31	1821	12.69	8,360 "	106	MARKET	61		8.84 "	8.4 "	7.50 "	1.76 "
		WEST & SOUTH	4.84 "	31	1667	11.95	9,800 "	108	OLIVE	58	116	8.84 "	8.4 "	7.50 "	1.66 "
FOURTH	APRIL 22, 1918	NORTH & EAST	4.99 "	31	1575	10.62	9,720 "	96	12TH ST NORTH	53		9.07 "	8.4 "	7.50 "	1.66 "
		SOUTH & WEST	4.96 "	31	1602	9.29	8,840 "	101	12TH ST.	46	99	9.07 "	9.0 "	7.50 "	1.66 "
GRAND	MAY 14, 1918	NORTH	6.55 "	33	3729	16.26	9,340 "	118	LACLEDE	107	122	8.73 "	9.6 "	4.28 "	1.36 "
		SOUTH	6.55 "	33	3563	16.03	9,280 "	119	CHOUTEAU	105	163	8.73 "	9.0 "	4.28 "	1.11 "
HAMILTON	MAY 7, 1918	NORTH	2.15 "	35	800	10.26	4,740 "	51	HODIAMONT RT OF W	22	52	8.60 "	9.6 "	10.00 "	5.00 "
		SOUTH	2.29 "	35	670	8.22	5,240 "	37	HODIAMONT RT OF W	19	20	8.60 "	9.6 "	10.00 "	6.00 "
HODIAMONT	MAY 15, 1918	EAST	8.12 "	29	2185	8.73	15,340 "	110	VANDEVENTER	71		9.94 "	10.2 "	4.28 "	1.11 "
		WEST	8.12 "	29	2019	8.82	16,160 "	86	GRAND	72	98	9.94 "	10.2 "	4.28 "	1.25 "
JEFFERSON	MAY 22, 1918	NORTH	5.55 "	30	2704	16.46	8,420 "	122	MARKET	91	133	8.32 "	9.0 "	7.50 "	1.04 "
		SOUTH	5.28 "	30	2866	16.69	7,800 "	122	PARK	88	126	8.32 "	9.0 "	6.00 "	1.16 "
LACLEDE	MAY 27, 1918	EAST	4.37 "	27	2110	17.87	7,880 "	94	18TH ST	72		8.74 "	8.4 "	7.50 "	3.33 "
		WEST	4.37 "	27	1582	16.63	7,320 "	104	JEFFERSON	55	130	8.74 "	8.4 "	7.50 "	3.00 "
LEE	MAY 9, 1918	NORTH & WEST	10.24 "	28	2603	9.48	9,820 "	78	MORGAN	87	128	8.76 "	9.6 "	7.50 "	2.00 "
		EAST & SOUTH	9.98 "	28	2553	7.37	10,400 "	77	CASS	76	109	8.76 "	9.0 "	7.50 "	2.30 "
MANCHESTER	MAY 3, 1918	EAST	7.82 "	28	2038	8.97	14,780 "	79	VANDEVENTER	70		9.36 "	9.6 "	7.50 "	2.00 "
		WEST	7.82 "	28	2192	9.72	14,920 "	85	GRAND	76	108	9.36 "	10.2 "	7.50 "	1.88 "
MARKET	MAY 6, 1918	EAST	7.50 "	29	2442	10.99	11,620 "	118	GRAND	83		9.00 "	10.2 "	7.50 "	3.00 "
		WEST	7.36 "	28	2497	12.08	13,160 "	111	18TH ST	89	145	9.00 "	9.6 "	10.00 "	3.33 "
NATURAL BRIDGE	MAY 10, 1918	NORTH & WEST	9.24 "	32	2298	8.07	11,200 "	92	MARKET	74	137	9.24 "	9.0 "	7.50 "	2.31 "
		EAST & SOUTH	9.18 "	32	2351	8.62	10,460 "	116	WASHINGTON	79	135	9.24 "	9.0 "	7.50 "	2.00 "
OLIVE-DELMAR	MAY 21, 1918	EAST	7.17 "	31	2893	12.83	13,040 "	115	VANDEVENTER	92		9.56 "	10.2 "	4.28 "	1.43 "
		WEST	7.24 "	31	2701	12.24	14,240 "	97	GRAND	89	132	9.56 "	9.6 "	4.28 "	1.30 "
OLIVE-MARYLAND	MAY 2, 1918	EAST	4.45 "	39	2504	14.94	10,520 "	128	18TH ST.	66		8.90 "	9.0 "	7.50 "	3.00 "
		WEST	4.59 "	39	1856	11.21	8,360 "	79	JEFFERSON	59	85	8.90 "	9.6 "	5.00 "	2.72 "
OLIVE-UNIVERSITY	MAY 20, 1918	EAST	7.31 "	28	2462	11.24	12,980 "	103	GRAND	82		9.74 "	10.2 "	5.00 "	1.58 "
		WEST	7.42 "	29	2156	9.91	15,080 "	94	JEFFERSON	74	114	9.74 "	10.2 "	5.00 "	2.00 "
PAGE	MAY 24, 1918	EAST	6.65 "	32	2088	9.07	13,300 "	114	JEFFERSON	62		9.13 "	10.2 "	4.28 "	.94 "
		WEST	6.69 "	31	1660	8.77	13,560 "	129	JEFFERSON	58	124	9.13 "	9.6 "	3.75 "	.80 "
PARK	APRIL 24, 1918	NORTH & EAST	5.29 "	32	2249	13.65	8,880 "	121	18TH & CHOUTEAU	70		9.34 "	9.0 "	7.50 "	1.30 "
		WEST & SOUTH	5.24 "	31	1869	10.96	10,980 "	105	12TH ST E. SIDE	58	124	9.34 "	8.4 "	7.50 "	1.87 "
SARAH	APRIL 26, 1918	NORTH	4.69 "	34	1998	11.68	6,940 "	64	OLIVE	54	103	7.80 "	9.0 "	7.50 "	3.00 "
		SOUTH	4.69 "	34	2002	12.02	6,680 "	47	HODIAMONT RT OF W	56	175	7.80 "	9.0 "	7.50 "	3.33 "
SOUTHAMPTON	APRIL 30, 1918	NORTH & EAST	7.59 "	25	1170	6.24	16,720 "	72	TOWER GROVE	31	67	9.10 "	9.6 "	15.00 "	7.50 "
		WEST & SOUTH	7.59 "	24	1201	6.50	14,320 "	91	TOWER GROVE	50	104	9.10 "	9.6 "	15.00 "	7.50 "
TAYLOR	MAY 29, 1918	NORTH	5.28 "	32	2812	16.77	7,980 "	98	EASTON	90	111	8.34 "	9.6 "	6.00 "	3.33 "
		SOUTH	5.28 "	32	3295	19.07	6,780 "	105	MCPHERSON	100	172	8.34 "	8.4 "	5.00 "	3.00 "
TOWER GROVE	MAY 8, 1918	EAST & NORTH	7.92 "	28	1897	8.50	12,580 "	89	JEFFERSON	67		9.50 "	10.2 "	6.00 "	1.50 "
		SOUTH & WEST	7.82 "	28	1557	7.19	14,620 "	98	CHOUTEAU	56	105	9.50 "	9.6 "	6.00 "	1.36 "
UNION	MAY 7, 1918	NORTH	4.41 "	34	1428	9.81	7,460 "	79	EASTON	43	97	10.17 "	10.8 "	7.50 "	3.75 "
		SOUTH	4.41 "	34	1457	9.57	8,820 "	58	EASTON	42	46	10.17 "	10.8 "	7.50 "	3.00 "
VANDEVENTER	MAY 28, 1918	NORTH	4.18 "	33	2065	13.11	7,000 "	97	LACLEDE	54	97	8.65 "	9.0 "	7.50 "	3.00 "
		SOUTH	4.18 "	33	2046	13.49	7,580 "	91	OLIVE	56	88	8.65 "	9.0 "	7.50 "	3.33 "
WELLSTON	MAY 23, 1918	EAST	6.84 "	28	2195	11.49	13,740 "	117	SARAH	73		10.26 "	10.2 "	4.28 "	.91 "
		WEST	6.15 "	28	1790	11.22	13,740 "	119	VANDEVENTER	67	128	10.26 "	9.6 "	3.75 "	.90 "
SUMMARY		TOTAL	389.61 "	1722	125632	622.52	605,900 "	5417		4077	4862	514.73 "	532.4 "	380.24 "	128.95 "
		AVERAGE		31		11.12	10,838 "	97		73	119	9.19 "	9.5 "	6.79 "	2.30 "

CHART No. 11

As has been previously stated, the present transit lines are a combination of a series of individual competing lines. The very evident inefficiency of the present system is well illustrated by map (No. 13) showing present transit lines. On this map the routing of the individual lines is indicated by certain designations. The theory of the plan proposed herewith is to effect a more simplified system of routings which can best be described by referring to map (No. 12) showing the theoretical diagram of the proposed transit system. An examination of the map (No. 13) indicates that there should be possible a much more desirable combination of north and south routes together with a straightening-out process which should offer quicker and more direct service to all parts of the city. A feature of the theoretical solution of the transit plan is to gather a majority of the east and west lines into a subway in the business district and so routing north and south lines through the business district as practically to avoid any intersection of lines, which is one of the present pregnant causes of delay and congestion in the business district.

FIRST STEP—INITIAL REROUTING OF PRESENT TRANSIT LINES

Under the first step there is possible the abandonment of 7.95 miles of single track and 7.47 miles of double track, making a total possible abandonment of 22.89 miles of single track. In order to complete the reroutings there would be necessary the construction of 4.59 miles of new single track and 2.19 miles of new double track, or a total of 8.97 miles of new single track to be constructed. Certain extensions of existing lines are also proposed, amounting in all to 9.93 miles of new double track construction. Accompanying the report is a plan (No. 14) showing the routing of lines in conformity to Step No. 1.

DESCRIPTION OF ROUTES

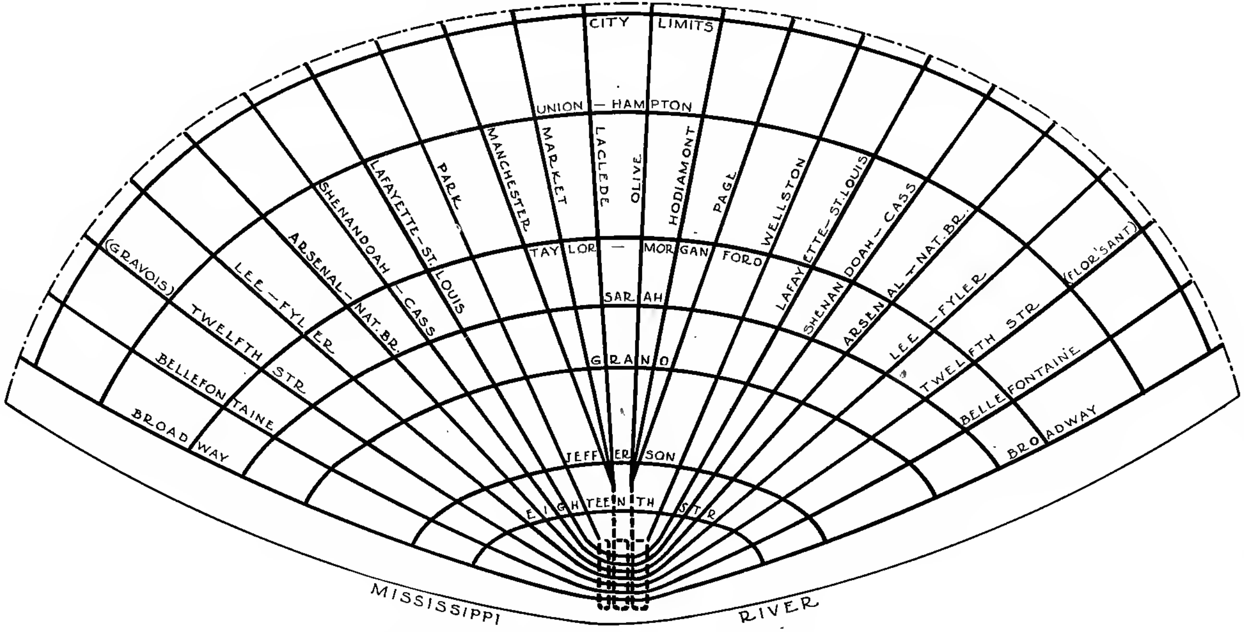
BELLEFONTAINE LINE:

In order to afford a more direct routing to the business district from the south this line would be straightened by being rerouted from Gravois Avenue and 18th Street via Russell Avenue and the new South 12th Street.

In the north it is proposed to extend this line westward from Robin Avenue and West Florissant Avenue via West Florissant Avenue to connect with the City Limits Line, also to be extended to this point.

BELT LINE:

18th Street Belt Line would be abandoned as such and be taken care of by other lines. 14th Street Belt Line would be a combination of portions of the present 18th Street and 14th Street Lines. From its present loop at Grand Avenue it would be routed over the eastern route of the 18th Street Belt Line to 19th Street and Cass Avenue, thence to have double track operation to 14th Street and to loop in the business district.



THEORETICAL DIAGRAM OF PROPOSED TRANSIT SYSTEM

PREPARED BY THE

CITY PLAN COMMISSION

SEPTEMBER 12, 1919 ~ ~ HARLAND BARTHOLOMEW ~ ENGINEER

DIAGRAM No. 12

The present transit system of St. Louis is a combination of original competing lines. No systematization has ever been attempted. The natural physical shape of the city suggests at once a system such as that represented in the above diagram by combining certain of the north and south lines operating through the business district and the combination of certain east and west lines into an underground system in the business district, thus causing practically no contact of lines, with a maximum amount of direct service to all parts of the city, supplemented by a complete crosstown line at approximately half mile intervals westward from the business district.

BROADWAY LINE:

Through routing of the present Broadway Line would remain unchanged. What is known as the Broadway Short Line would be operated from Taylor Avenue on the north to Broadway and Jefferson Avenue on the south; thence west on Chippewa Street to Grand Avenue, supplementing present operation of the Lee Line south of the business district.

CHEROKEE LINE:

This line would be more directly routed to the business district from 18th and Sidney Streets via 18th Street, Russell Avenue and the new South 12th Street route to Clark Avenue.

CITY LIMITS LINE:

It is proposed to gradually extend this line on the south and north until it becomes a belt line following the outer limits of the city and connecting all the radial lines. It would use the Hodiamont right-of-way from Hamilton Avenue to the Suburban Gardens, thence north via Kirkwood-Ferguson right-of-way to Natural Bridge Avenue and Jennings Station Road to Florissant Avenue, looping at Pine Lawn.

COMPTON LINE:

The route would be shortened and simplified by having double track operation from its present terminus at Magnolia Avenue and Thurman Boulevard to the business district via Thurman Boulevard, Shenandoah, California, Lafayette Avenues, 18th Street and Washington Avenue.

FOURTH STREET LINE:

A minor change would be made in the routing of this line so that it would have double track operation from Mississippi and Lafayette Avenues via Lafayette Avenue, 18th Street and Chouteau Avenue to the business district.

GRAND AVENUE LINE:

The only change to be made in the present route would be the extension at the northern extremity via 20th Street and Prairie Avenue to Broadway.

HODIAMONT LINE:

It is proposed to make Maple and Hodiamont Avenues the western terminus of this line, operation northward from that point to be taken over by the City Limits Line.

The new routing to the business district is to be double track operation via Franklin Avenue and High Street only.

LEE LINE:

In order to furnish service to the new industrial district in the northwestern portion of the city, it is proposed to extend this line via Lee Avenue, Euclid Avenue and Bircher Street to connect with the City Limits Line. Operation south of Lucas Avenue would be taken over by the Broadway Short Line, as previously stated.

MARKET LINE:

The eastern route would be the same as the western route by installing double track operation on Market Street between Compton Avenue and 21st Street.

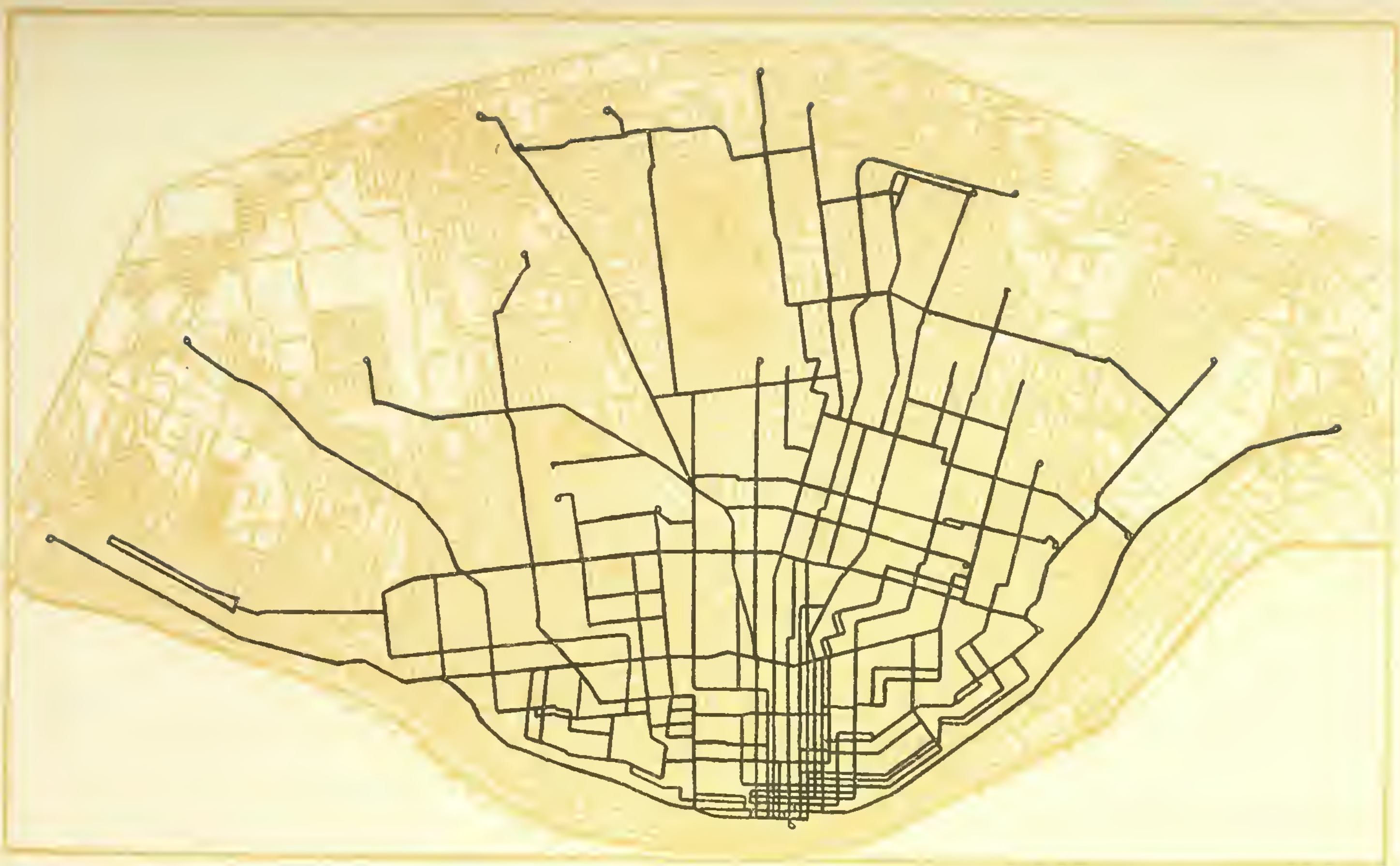


DIAGRAM No. 13
Present transit system in St. Louis. Note unnecessary duplication of track in many places and lack of direct routes to the north and south.

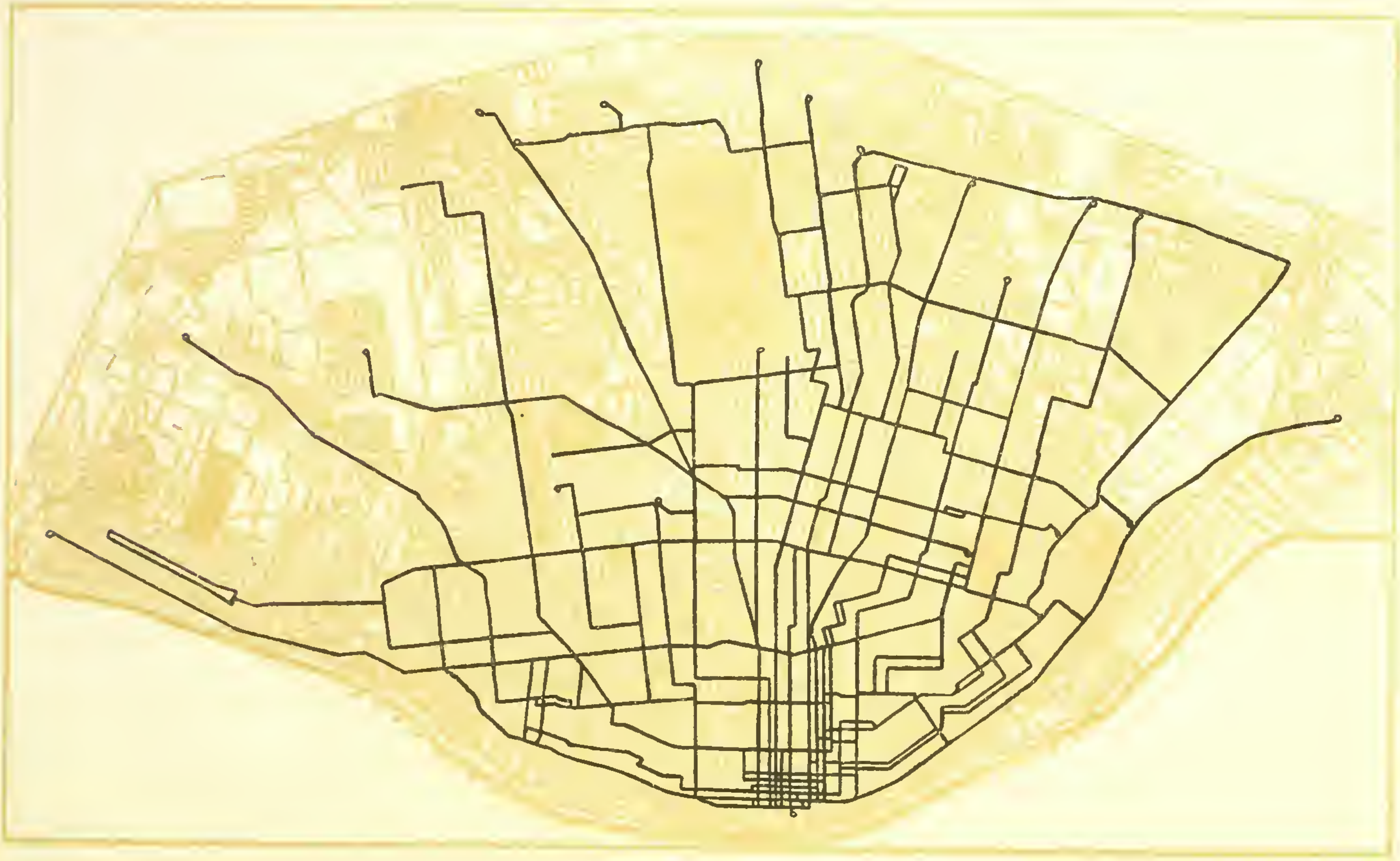


DIAGRAM No. 14
Step No. 1, showing first re-routings and extensions suggested in this report.

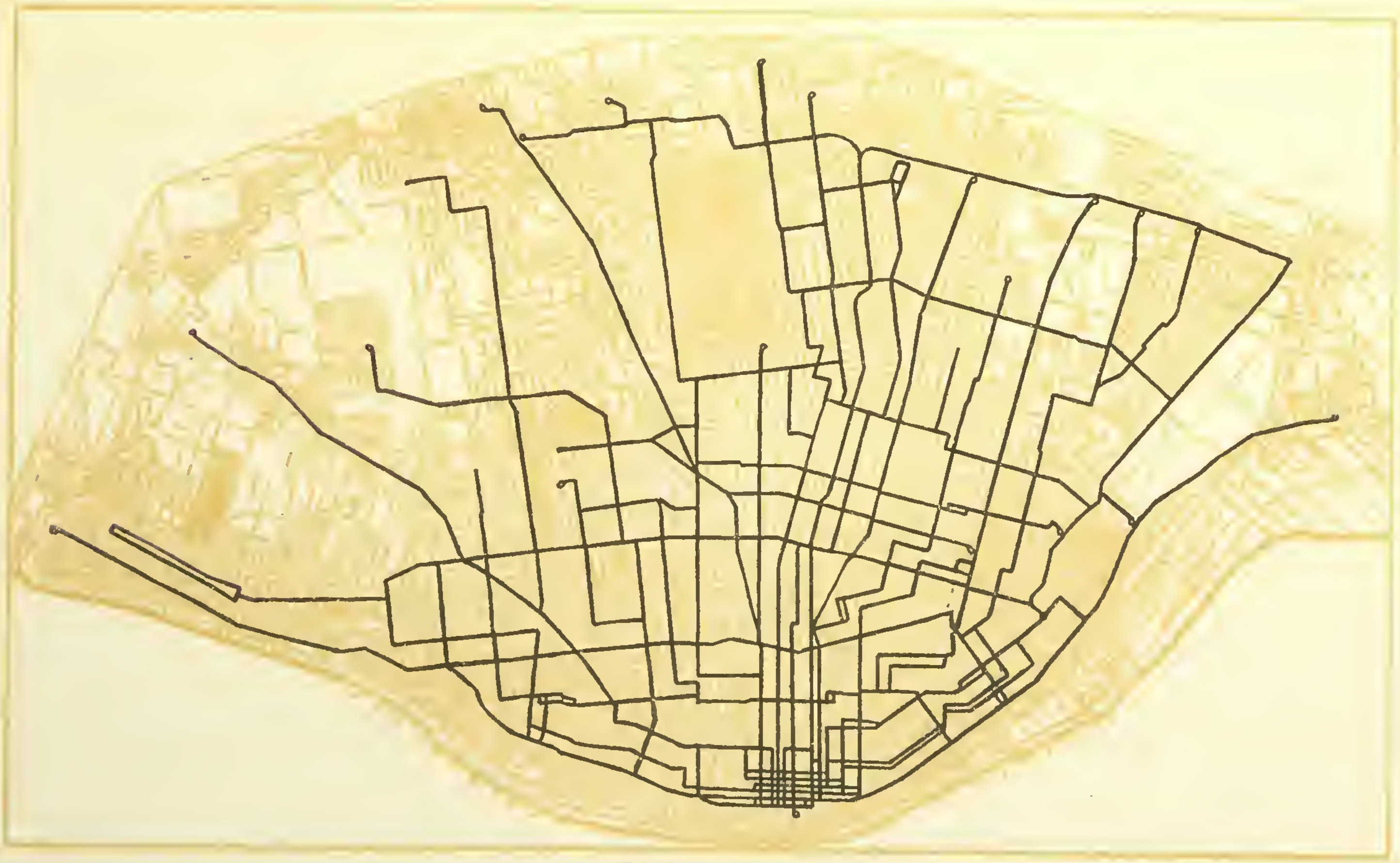


DIAGRAM No. 15
Step No. 2, showing further re-routings and extensions and elimination of duplicating track suggested in this report.

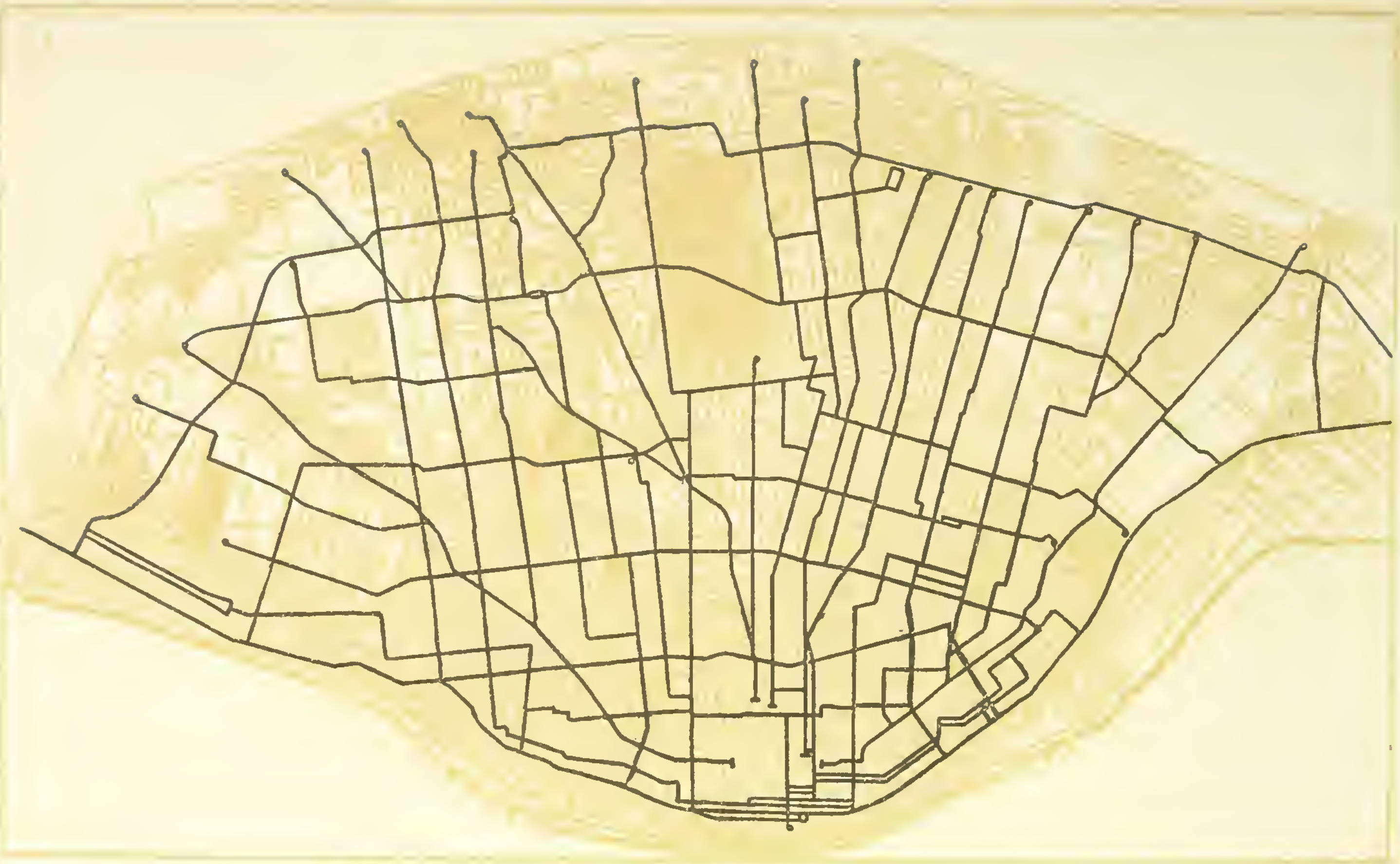


DIAGRAM No. 16

Final step showing complete re-routing, extensions and elimination of duplicating track suggested in this report.

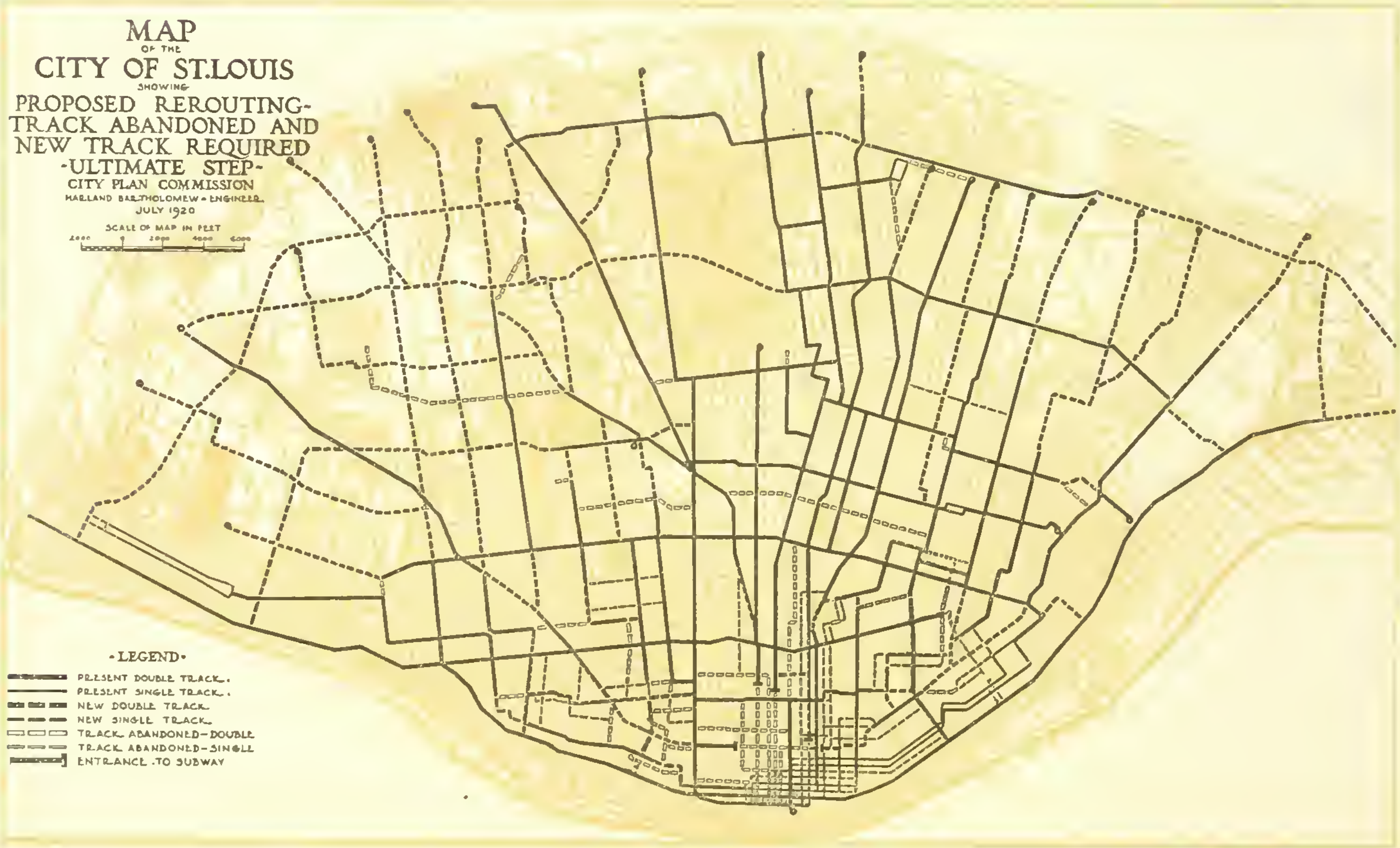


DIAGRAM No. 17

Showing location of proposed extensions and track elimination as suggested in the several steps described in this report.

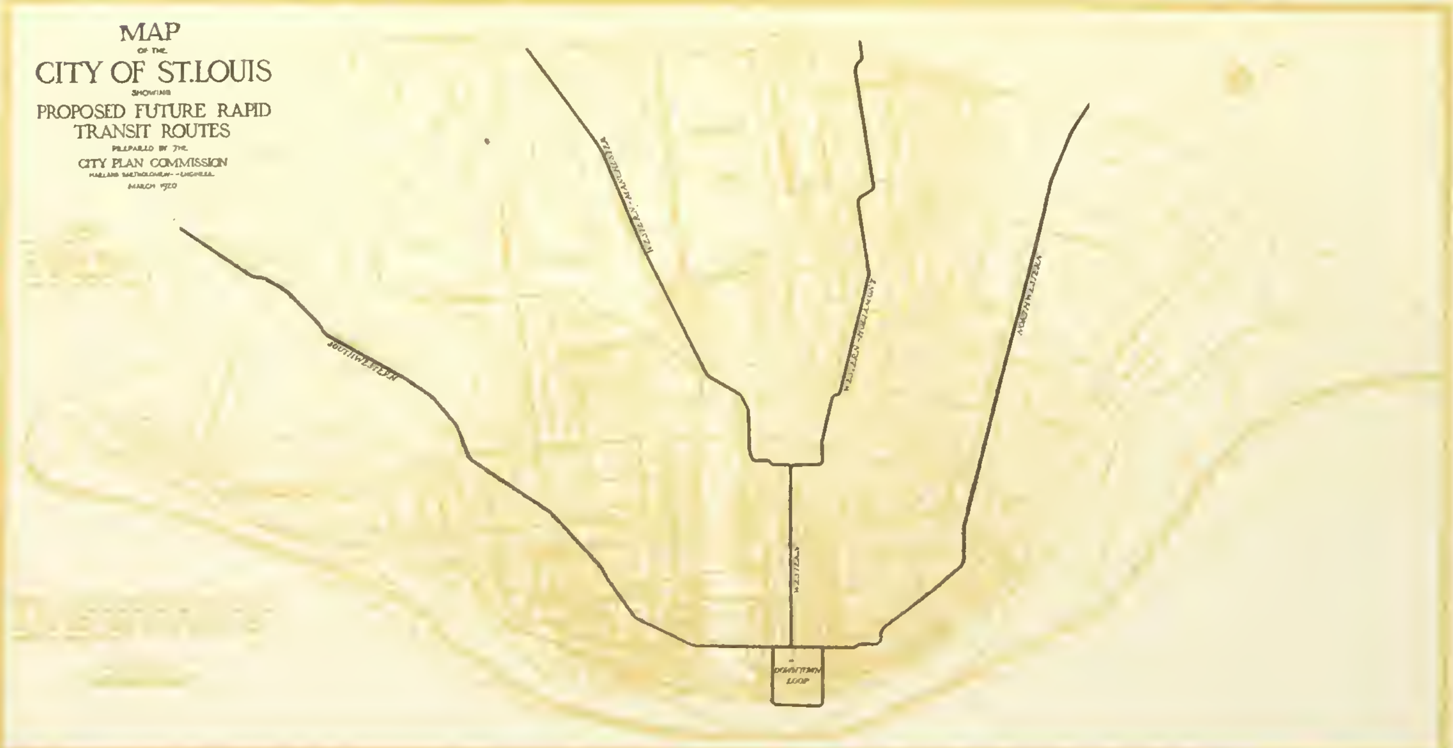


DIAGRAM No. 18

Showing distribution of population, present transit lines and suggested location of future rapid transit routes which will best serve entire city area.

NATURAL BRIDGE LINE:

As this is the most logical line to connect the new industrial district with the business district, it would be extended westward from Kingshighway Boulevard to Jennings Station Road via Natural Bridge Avenue.

PAGE LINE:

This line has recently been double tracked on Lucas Avenue west of Leffingwell Avenue and no further change is suggested.

TAYLOR LINE:

As a preliminary step in making this a complete cross-town line it would be extended to a terminus at Tower Grove and Magnolia Avenues via Chouteau and Tower Grove Avenues.

TOWER GROVE LINE:

In order to meet the present needs of the Lindenwood district, this line would be extended westward to terminus at McCausland and Pernod Avenues, via Arsenal, Ivanhoe, Fyler and McCausland Avenues. It is suggested that it be rerouted from Gravois Avenue and 18th Street via Russell Avenue and the new South 12th Street, a change which would materially shorten the route to the business district.

UNION LINE:

In order to eliminate operation of the "Y" at Pershing and DeBaliviere Avenues, a loop could be created by operating north on DeBaliviere and east on Delmar Avenue to Union Boulevard.

WELLSTON LINE:

The route of this line would be simplified by giving it double track operation over Easton Avenue and Wash Street to its loop in the business district.

HAMILTON DUMMY LINE:

For the accommodation of people using the DeBaliviere entrance to Forest Park and others desiring north and south cross-town operation in the vicinity of DeBaliviere Avenue and Hamilton Avenue, a new short line is proposed to operate from the intersection of Pershing and DeBaliviere Avenues via DeBaliviere Avenue, Delmar Avenue and Hamilton Avenue, using the present loop of the Page line at Plymouth, Hodiamont and Etzel Avenues.

NEW EIGHTEENTH STREET LINE:

In view of the abandonment of the 18th Street Belt Line as such, a new line is proposed which would afford direct cross-town communication over 18th Street, a badly needed route affording direct access to Union Station, connecting with Broadway on both the north and south, and intersecting all east and west bound lines throughout the city. This line would operate from St. Louis Avenue and Broadway on the north via St. Louis Avenue, 19th, Biddle, Carr and 18th Streets, and looping on the south via Sidney, Lemp and Arsenal Streets, Broadway, Pestalozzi and 18th Streets.

Under Step No. 1 no provision has been made for extending the present transit lines to the river front.

Transportation studies now being made by the City Plan Commission will include the extension of transit lines to provide access to the river, but the nature of such extensions will depend upon the plan that may be adopted for the improvement of the river front. Consequently, no further mention of such extensions will be made in this report, but they will be adequately provided for under the transportation plan when completed and published.

SECOND STEP—SECONDARY REROUTING OF TRANSIT LINES

Step No. 2 embraces further rerouting of the transit lines in anticipation of the final scheme for making more direct routes from the business district. In general Step No. 2 involves the combination of certain lines in the north and south to permit of through routing—a well recognized principle of good transit operation.

Step No. 2 involves the abandonment of 12.38 miles of single track and 10.09 miles of double track or a total of 32.56 miles of single track. For the accommodation of lines constructed on new streets there would be necessary 6.51 miles of single track and 7.24 miles of double track to be constructed. Extensions contemplated under Step No. 2 involve 12.5 miles of new double track construction. These figures include those mentioned under Step No. 1.

One of the more radical changes suggested under Step No. 2 which, however, could be carried out with very little inconvenience and at no expense, is a change in the routing of traffic on one-way north and south streets in the business district. This is recommended for the sake of simplifying operation and preventing many unnecessary crossings of lines. It merely means the reversal of present operation on 6th, 7th, 8th and 9th Streets from north to south and south to north.

An accompanying plan (No. 15) shows the transit lines of the city rearranged in accordance with the suggestions contained in Step No. 2.

The rerouting of the various lines where they differ from Step No. 1 are described as follows:

BELLEFONTAINE LINE:

As a further step in straightening, this line would be rerouted from California Avenue and Cherokee Street via Cherokee Street, Lemp Avenue, Arsenal, Pestalozzi, 9th, Hickory and 6th Streets to Walnut Street, that is in general via portions of the present routes of the Cherokee and Natural Bridge lines.

BELT LINE:

Fourteenth Street Belt Line would be abandoned as such since it is felt that the service rendered by this line can be taken care of by the proposed rerouting of some of the longer radial lines.

CASS LINE: (Shenandoah-Cass)

It is proposed that the Cass Line be rerouted in the northern part of the city so as to loop about Spring Avenue, Natural Bridge Avenue, Prairie Avenue and Hebert Street, thence via Spring Avenue to St. Louis Avenue, and from that point via the present routes of the Cass Line. For through operation it is to be combined with the Compton Line on the south and to be known as the Shenandoah-Cass Line. The route of the Compton Line would be followed to Lafayette Avenue and 18th Street, thence to the business district via Lafayette Avenue, Soulard Street, Broadway, Chouteau Avenue and 6th Street.

Operation of the present Cass Line west of Grand Avenue is practically abandoned. A study of the map will indicate that another line (Lafayette-St. Louis Line) has been substituted for the sake of through routings. It is believed that the Cass Line as here described under Step No. 2 will ultimately operate west on Natural Bridge Avenue to the City Limits Line, inasmuch as the extensive development of an industrial district will warrant the operation of extensive car service, and a second line on Natural Bridge Avenue will afford access to a greater area of the city for all traffic originating or terminating in the Natural Bridge industrial district.

CHEROKEE LINE:

Assuming that the widening of Gravois Avenue can be effected within the next few years, it is proposed to shorten the route of the Cherokee Line considerably by rerouting it over Gravois Avenue and the new South 12th Street to its loop in the business district.

CITY LIMITS LINE:

In order to straighten this line it would be operated from Skinker Road and Delmar Avenue to Maple and Hodiamont Avenues via the new Skinker-Hodiamont connection.

FOURTH STREET LINE: (Lafayette-St. Louis)

It is proposed to combine the Fourth Street Line with a new line in the northern part of the city to operate west of Prairie Avenue on St. Louis Avenue to Belt Avenue and to be known as the Lafayette-St. Louis Line. East of Prairie and St. Louis Avenues it would be operated via Prairie Avenue and North Market Street, thence via the present routes of the Natural Bridge Line to Leffingwell Avenue and to enter the business district via Wash Street. In order to provide service in the district bounded by St. Louis Avenue, Kingshighway Boulevard, Easton and Taylor Avenues, where two small lines now operate known as the Marcus and Spalding Lines, it is proposed that a slight extension of the 4th Street Line be made by routing it via Newstead, Maffitt and Taylor Avenues and the route of the Spalding Line.

It is also proposed to extend the 4th Street Line on the south through the Shaw Addition and to combine it with the present Southampton Line. An examination of the map will indicate the desirability of this suggestion until such time as traffic on the Southampton line becomes voluminous. It would possibly be wise to split the 4th Street Line at Tower Grove Avenue; to operate in part westerly to Southampton, eventually the entire operation of this line would be to Southampton. From the terminus at Wherry and Devonshire Avenues it would follow the route of the Southampton Line to Shaw Avenue, east on Shaw Avenue to Grand Avenue, thence via the Fourth Street Line to Chouteau Avenue, thence via 18th Street and Washington Avenue to the business district.

JEFFERSON LINE:

In place of having this line use its present loop at Fairground Park, it would be routed from Jefferson Avenue and Hebert Street to connect with the Broadway Line via Jefferson Avenue, Palm and Salisbury Streets.

LEE LINE: (Lee-Fyler)

It is proposed that a new line be created in the southern part of the city to operate on Cherokee Street and McDonald Avenue and eventually into the southwestern section of the city over Fyler Avenue. This line would be combined with the Lee Line on the north and known as the Lee-Fyler route. From its terminus at Bent and McDonald Avenues it would be routed via McDonald Avenue, Cherokee Street, California Avenue, Arsenal Street, Lemp Avenue, 18th Street, Russell Avenue, 12th Street, Chouteau Avenue and 4th Street to the business district.

In the northern part of the city it would have two branches running west from Kingshighway Boulevard and Bircher Street, the one extending directly out Bircher Street to the City Limits Line as described under Step No. 1, the other using Lillian Avenue to the City Limits Line. It also would have double track operation from 15th Street to the business district via Cass Avenue and Broadway.

NATURAL BRIDGE LINE: (Arsenal-Natural Bridge.)

It is proposed that the Natural Bridge Line be connected with the Tower Grove Line in order to provide through routing and to avoid looping in the business district, this line to be called the Arsenal-Natural Bridge Line. In the northern part of the city the route west of Prairie Avenue would remain the same. East of Prairie Avenue it would be routed via Natural Bridge Avenue and Palm Street, thence it would follow in general the route of the abandoned 14th Street Belt Line and passing through the business district would connect with the Tower Grove Line.

In the southern part of the city it would have practically the same routing as that of the Tower Grove Line under Step No. 1. South of the business district the route of the Natural Bridge Line would be abandoned and taken over by the Bellefontaine Line as previously stated.

OLIVE (MARYLAND) LINE:

The western terminus would be changed from Kingshighway and Maryland Avenues to Euclid and Maryland Avenues.

FINAL STEP—COMPLETE REROUTING OF SURFACE CARS AND SUBWAY LOOPS IN BUSINESS DISTRICT

The complete rerouting of the surface car lines contemplated under Step No. 3 is in anticipation of the construction of subway loops in the business district for the exclusive use of surface cars. Any attempt to provide subway facilities in the business district of this city is complicated in many ways. With but one or two exceptions the extremely narrow streets of the business districts do not permit of anything more than double track construction in any one street. The presence of the Eads Bridge tunnel running practically through the heart of the business district and immediately below the surface of Washington Avenue and Eighth Street seriously complicates subway construction. Still more unfortunate in planning subway facilities within the business district is the necessity for providing facilities over the comparatively large area bounded approximately by Twelfth Street, Fourth Street, Market Street and Washington Avenue as a minimum, thus necessitating the construction of more mileage in subways than an ideal and economical plan might warrant.

Taking all these factors into consideration it has been deemed necessary, therefore, to recommend in the first place that the Eads Bridge tunnel under the business district be abandoned for freight and passenger train movement because of its great interference in any plan that might be adopted. The present scheme, therefore, is predicated upon the removal or abandonment of the present tunnel for train movement and assuming that its operation should be superseded by use of the St. Louis Municipal Bridge and the lower deck of the Eads Bridge given over to rapid transit purposes, or on the other hand that if the Eads Bridge must be maintained for freight and passenger train movement, access to the Mill Creek Valley should then be secured by replacing the 8th Street tunnel with one along 3rd Street and Poplar Street or at some such other convenient location as not to interfere with the more important subway construction under the business district.

A further complication of subway construction is that while in the first case subways will be used only for surface cars in order to reduce surface congestion in the business district, such subway construction as is now undertaken must anticipate further construction of subways in order to accommodate a rapid transit line which shall be separated from the subways used exclusively for street cars. When it becomes necessary to construct these rapid transit lines there must be complete separation of the two facilities and in so doing it is highly desirable that the two systems of subways use separate streets, in order that all may be as close as possible to the surface of the streets, thus avoiding more or less objectionable and difficult means of access and egress as well as greater expense.

Each of these various considerations have been given attention and it is believed that the plan submitted herewith is the most practical and satisfactory when considered from all view points. It need not all necessarily be constructed in the first instance but will lend itself to gradual development, thus permitting the distribution of the cost over a period of years.

Accompanying this report is a diagram (No. 12), showing the theory of the proposed transit system suggested in this report. It will be noticed that in the northern and southern parts of the city the lines successively removed from the river front have been combined in order to make possible through operation of these lines, thus avoiding numerous corners and subsequent retardation of traffic movement. From this diagram it will also be noted that all east and west lines have diverted into the proposed subway, while, depending upon the volume of traffic, certain of the north and south lines can also be rerouted through the subways. The plan proposed therefore, removes all east and west lines from the surface of the streets in the business district with the exception of Washington Avenue, where there would be less operation than at present. There would also remain on the street surface in the business districts, transit lines running north and south only on 4th Street, Broadway, 6th and 7th Streets.

There are two distinct loops to be created, either of which may be used for surface car operation or for rapid transit lines. It is our recommendation that the shorter loop be constructed in the first instance in order to eliminate great initial expense. If, on the other hand the business interest of the community demands the larger looping in the first instance, this can be created, provided the necessary funds can be obtained.

The shorter loop scheme provides for track on 12th Street from Spruce to Carr and on 9th Street from Chestnut to Morgan Streets; on Market Street from 20th to 12th; on Chestnut Street from 12th to 9th; on Olive Street from 19th to 12th; on Washington Avenue from 12th to 9th; on Morgan Street from 12th to 9th and on Franklin Avenue from 12th to 14th. The entrance for this subway system would be respectively at 12th and Spruce, 20th and Market, 19th and Olive, 14th and Franklin and at High and Carr Streets. It is proposed to use 9th Street instead of going further east in order to avoid dipping under the 8th Street tunnel, while through the use of 9th Street a system could be constructed in the first instance without regard to the eventual disposition of the tunnel. Assuming that this subway plan were to be adopted in the first instance the routings of the various lines would then be as are shown on the accompanying plan and described in the individual line routings which follow below.

The eventual loop to be constructed for rapid transit purposes is also shown on the accompanying plan (No. 19). A previous plan (No. 18) shows the rapid transit routes that undoubtedly will be constructed to the northern, western and southern parts of the city. The entrances of these lines through the business district will undoubtedly be on 12th Street to the north and south and on Olive Street to the west. Under the various street opening and widening plans now being undertaken by the city, and which are absolutely necessary to any future rapid transit construction both within the business district and in the outlying sections of the city, it is quite evident that the rapid transit loop should follow a loop practically surrounding the business district and using 12th Street, Market Street, 4th Street and Franklin Avenue with a connecting line over 8th Street between Market and Franklin. The present tunnel now in 8th Street could be used for this line, and since it is connected with the lower deck of the Eads Bridge a rapid transit line to the east would be possible which could use the rapid transit subway loop here proposed.

It is estimated that the initial short loop subway for surface car operation would cost $17,000,000. It is estimated that the downtown construction for the rapid transit loop on Market, 4th, 8th Streets, Franklin Avenue and 12th Street to Spruce Street would cost $17,000,000, while the complete rapid transit scheme including the downtown rapid transit loop and routes to the northwestern, southwestern and the two western parts of the city

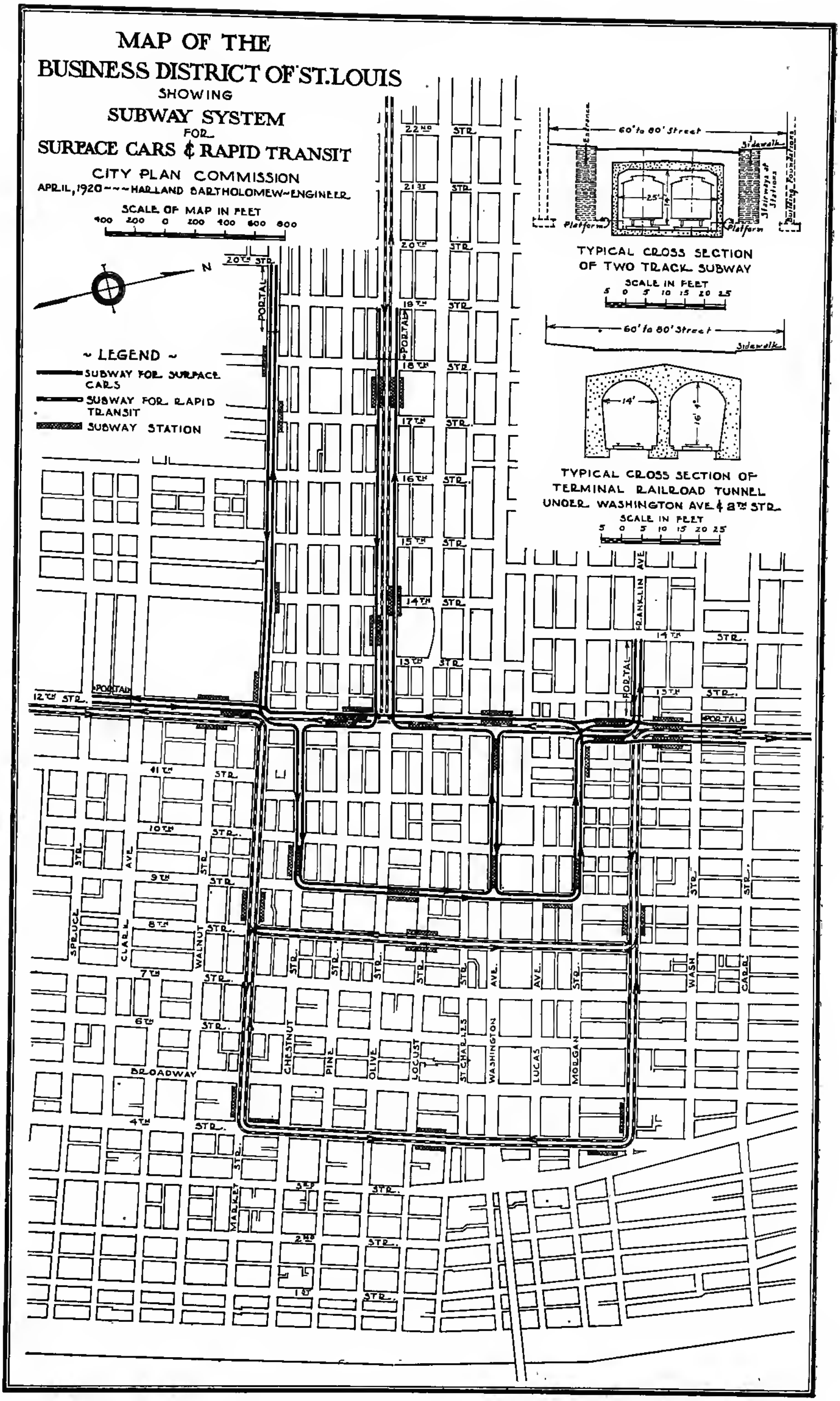


DIAGRAM No. 19

The question of providing subway facilities for St. Louis is extremely complicated. The presence of the 8th street tunnel traversing the heart of the downtown district and close to the surface would require that all east and west operation subways either cross the tunnel at grade, a wholly undesirable practice, or that the subways dip under the tunnel. It was therefore decided that in order to provide adequate subway facilities the abandonment of the tunnel for railroad purposes would be necessary. The business district covers a great area and many high buildings are located on numerous narrow streets, thus necessitating subway construction on several streets in order to provide looping facilities. The above plan represents an eventual scheme of a sufarce car loop within a larger rapid transit loop. The larger loop might be constructed in the first instance and used for surface car operation in order to immediately relieve congestion on the downtown streets. When rapid transit becomes desirable, the large loop can be given over to rapid transit operation and surface cars removed to the smaller loop.

would cost $80,000,000, making a total of $97,000,000 for all of the construction for rapid transit purposes and for removing practically all of the surface cars from the surface of the streets in the business districts.

The rapid transit system is separated into two distinct systems, that for the routing of surface cars in the downtown district, and that for a distinctly rapid transit system which would operate entirely by subway or elevated tracks within the city. There will be no contact of the two systems, excepting that the stations may be operated in common. The rapid transit subway where necessary will dip below the surface car subway to avoid grade crossings. All subway construction will be for double tracks excepting on 12th Street between Spruce and Carr and on Olive Street from 12th to 19th Streets, which will be of four track construction.

The above estimates are for subway construction in the eastern downtown district out to respectively, Grand and Gravois, Vandeventer and Chouteau Avenues, Vandeventer and Hodiamont right-of-way, and Grand and Natural Bridge Avenues. From these points the estimates are for concrete elevated structures spanning the surface car tracks, excepting in the Hodiamont right-of-way, which will be elevated by building two concrete retaining walls and filling in with earth. At the street intersections the elevated structure will be carried over the streets.

The cost of subway construction is from five and one-half to seven times as great as an elevated structure and will cause a variation in the above figures greater or less as the amount of subway construction is decreased or increased.

A final rearrangement and rerouting of the surface car lines will be essential in order to provide the necessary extensions for service throughout the city as well as to permit of adequate routing to and through the downtown subway. Map No. 16 shows the final arrangement of all the transit lines in the city in accordance with the scheme here proposed. Map No. 17 shows the total amount of track that could be abandoned and of new track that should be constructed.

Under Step No. 3 (ultimate), there is possible the abandonment of 21.17 miles of single track and 23.4 miles of double track, making a total possible abandonment of 67.97 miles of single track.

In order to complete the rerouting there would be necessary the construction of 8.45 miles of new single track and 12.5 miles of new double track, or a total of 33.45 miles of new single track (exclusive of track in subways). Extension of existing lines amounting to 62.67 miles of double track construction are also proposed.

A description of each of the individual line routings is given below, under Step No. 3.

BELLEFONTAINE LINE:

The southern terminus would be changed from Primm Street to Davis Street so as to connect with the City Limits Line, which would be extended around the entire outer limits of the city. In order to straighten this line a slight change would be made by routing it from Cherokee Street and Lemp Avenue via Cherokee, 13th, Utah and 9th Streets.

In the northern part of the city this line would terminate at 20th Street and Grand Avenue; operation westward from that point would be taken over by the New 12th Street Line.

In the business district this line would remain as one of the cross-town surface lines.

BROADWAY LINE:

In anticipation of the development of the southwestern portion of the city it is proposed to extend the Broadway Short Line from Grand Avenue to the City Limits via Chippewa Street and Lindenwood Place.

In the northern part of the city the terminus of the through cars would be moved from Doddridge Street to the City Limits Line via Broadway and the Bellefontaine Road.

NEW TWELFTH STREET LINE:

It is proposed to form a new line which will serve to link the southern part of the city to the northern part of the city. This line will utilize the two most direct radial Streets, Gravois Avenue on the south and the New 12th Street and Natural Bridge Avenue on the north. It would be in reality a combination of the Cherokee Line and part of the Bellefontaine Line and known as the Twelfth Street Line.

In the southern part of the city the cars would alternate south of Winnebago Street via Gravois Avenue to Bewen Avenue and via Alexander, Loughborough Streets and Morganford Road to Weber Road. From Gravois Avenue and Winnebago Street it would follow the same route as the Cherokee Line under Step No. 2, namely, via Gravois Avenue and New South 12th Street.

In the northern part of the city this line would be substituted for the abandoned Bellefontaine Line west of Grand Avenue. East of Grand Avenue it would operate via Florissant Avenue and the New North 12th Street.

In the business district it would operate in the subway via 12th, Chestnut, 9th, Morgan and 12th Streets.

CASS LINE (Shenandoah-Cass):

By removing the southern terminus from Thurman Boulevard and Tower Grove Avenue to Tower Grove and Magnolia Avenues, this line would be operated via Shenandoah and Tower Grove Avenues.

In the northern part of the city a slight change would be made by routing from 19th Street and Cass Avenue to its loop at Spring, Natural Bridge and Prairie Avenues.

CITY LIMITS LINE:

In order to connect with the Broadway Line on the south as well as on the north and to form an outer belt line, it is proposed to extend the City Limits Line through the southwestern and southern portions of the city from Yale and Manchester Avenues to Broadway and Davis Street via Hewitt, Southwest, Ivanhoe, Donovan, Loughborough Avenues, proposed new streets and Davis Street.

In the northern part of the city the route would be extended via Hodiamont and Church Avenues, the cars to alternate from Church and McLaran Avenues via Church Avenue and proposed new street to Riverview Drive and via McLaran Avenue to the Broadway Line.

EIGHTEENTH (NEW) STREET LINE:

It is proposed to install double track operation throughout the entire length of this line with its southern terminus at Arsenal Street and Broadway. Its route would be via Arsenal Street, Lemp Avenue, 18th, Carr, 19th Streets and St. Louis Avenue.

FOURTH STREET LINE (Lafayette-St. Louis):

For the purpose of rendering service to as large an area as possible the line would have two branches which extend westward from Sarah Street and St. Louis Avenue and terminate at the City Limits Line. One would be routed via St. Louis Avenue and its extension, the other via Sarah Street, Kennerly Avenue, Whittier Street, Cottage, Spalding, Union Avenues and North Market Street.

Its route would be straightened so that it would operate from Cass and Garrison Avenues via Cass Avenue, 19th, Carr, 18th and Wash Streets, thence it would pass through the business district as one of the remaining cross-town surface lines.

In order to bisect the territory in the south through which this line runs and to which it furnishes service it would be routed from Kingshighway Boulevard and Southwest Avenue via Southwest Avenue, Brannon Avenue and its connections, Neosho Street and Eichelberger Avenue to Donovan Avenue.

GRAND AVENUE LINE:

It is felt that this line would be of greater service if it were extended south from Meramec Street to Carondelet Park over its natural route, Grand Avenue and Grand-Kingshighway.

HODIAMONT LINE:

Since the movement of the population is steadily toward the west it is proposed to extend this line from Hodiamont and Maple Avenues to Ferguson Avenue and Olive Street Road via Maple Avenue and Olive Street Road.

East of Jefferson Avenue this line would be routed via Franklin Avenue, 21st and Olive Streets and entering the subway at 19th Street would loop via Olive, 12th, Chestnut and 9th Streets, Washington Avenue, 12th and Olive Streets.

LACLEDE LINE:

The only change in the routing of this line would be its removal as a surface line in the business district. It would operate in the subway east of 20th and Market Streets via Market, 12th, Chestnut, 9th, Morgan, 12th and Market Streets.

LEE LINE (Lee-Fyler):

In the northern part of the city considerable time can be saved through the straightening of this line east of Grand Avenue. It would be rerouted from Bremen Avenue and 25th Street to the business district via 25th, Palm, new North 12th Streets to Cass Avenue.

To complete the extension of this line into the southwestern portion of the city it is proposed to continue the line from Bent and McDonald Avenues via McDonald Avenue and its extension, Fyler and Manhattan Avenues, its western terminus to be at Sussex and Manchester Avenues.

MANCHESTER LINE:

A branch of this line, which would furnish service to the district south of Forest Park heretofore unserved, would be operated westward from the intersection of Dale and Manchester Avenues to Yale Avenue via Dale and West Park Avenues.

A change which would be made in the routing of this line to the business district would be its rerouting from 21st street and Chouteau Avenue via Chouteau Avenue, 12th Street into the subway at Spruce, thence via 12th, Chestnut, 9th, Morgan and 12th Streets.

MARKET LINE:

Two changes are suggested, one to extend its western terminus to Pennsylvania Avenue via South Avenue, the other to operate the cars in the subway, east of 20th and Market Streets via Market, 12th, Chestnut, 9th, Morgan, 12th and Market Streets.

NATURAL BRIDGE LINE (Arsenal-Natural Bridge):

This line can furnish more effective service north of the business district by being straightened and installing double track operation from Hebert and 23rd Streets via 23rd, North Market and New North 12th Streets, to Carr Street. In the business district it would be operated in the subway via 12th, Chestnut, 9th, Morgan and 12th Streets.

In order to avoid duplication of service this line would be extended directly westward from Ivanhoe Avenue via Arsenal Street to City Limits.

OLIVE LINE:

As a means of relieving the congestion on one of the most used thoroughfares in the business district, it is proposed to route this line in the subway east of 19th street via Olive, 12th, Chestnut, 9th Streets, Washington Avenue, 12th and Olive Streets.

PAGE LINE:

By changing the route of the Page Line from Etzel Avenue to Page Avenue to the City Limits, the territory between the Wellston and Hodiamont Lines would be more evenly divided and the population which is denser north of Page Avenue would be better accommodated.

For the purpose of completing the removal of car tracks on Washington Avenue west of 18th Street, it is proposed to reroute this line east of Franklin and Grand Avenues via Franklin Avenue to the subway at 14th Street. It would loop in the subway via Franklin Avenue, 12th Street, Washington Avenue, 9th Street, Morgan and 12th Streets and Franklin Avenue.

PARK LINE:

Since the district north of Tower Grove Park between Grand and Tower Grove Avenues would be adequately served by the two radial lines, the Shenandoah-Cass and Lafayette-St. Louis, the Park Line would be extended westward to the River des Peres district. It would be operated from 39th Street and Park Avenue to Kingshighway Boulevard and Vandeventer Avenue via Park Avenue, Thurman Boulevard, Folsom and Vandeventer Avenues. West from Kingshighway Boulevard the cars would alternate to Mackenzie Avenue and Watson Road via Southwest Avenue, Arsenal Street, New Hampton Avenue and Watson Road and to Ivanhoe and Columbia Avenues via Bischoff Street, Hampton and Columbia Avenues.

SARAH LINE:

In order that there may be a cross-town line to care for the traffic to and from the railroad stations at Tower Grove and Vandeventer Avenues in place of the Vandeventer Line which would be abandoned, the Sarah Line would operate from Sarah Street and Chouteau Avenue to Tower Grove and Folsom Avenues via Sarah Street, Vandeventer and Tower Grove Avenues.

TAYLOR LINE:

With a view toward straightening this line in the north it would have double track operation from Maffitt and Taylor Avenues via Taylor and St. Louis Avenues to St. Louis Avenue and from Carter and Newstead Avenues via Newstead and Taylor Avenues.

It is proposed to make this a complete belt line which would intersect all the radial lines of the city. For this reason it would be extended from Tower Grove and Magnolia Avenues via Tower Grove Park, Morganford Road and Bates Street to Broadway.

UNION LINE:

As a means of direct communication between the southwestern and northwestern portions of the city, the Union Line would be extended from Union Boulevard and Pershing Avenue through Forest Park to Gravois Avenue via Billon and new Hampton Avenues. It also would be extended on the north from Union and Florissant Avenues to Broadway via Calvary Avenue.

VANDEVENTER LINE:

The abandonment of the Vandeventer Line is the most radical change but less drastic than it really seems from the standpoint of good transit operation. At least in theory the most satisfactory solution seems to be the more intensive development of the Sarah Line for the following reasons: (1) Not enough traffic in this locality; (2) Sarah Line best spaced with respect to Grand and Taylor Avenues.

WELLSTON LINE:

As a last step in the removal of east and west tracks in the business district, the Wellston Line would be rerouted from 14th and Wash Streets via 14th Street to the subway at 14th Street and Franklin Avenue, looping in the subway via Franklin Avenue, 12th Street, Washington Avenue, 9th Street, Washington, Morgan and 12th Streets and Franklin Avenue.